



Certificate

The appendix of this certificate is consistent with the archived file of the patent application document of the CNIPA.

Application No./Patent No.: 2018106401579

File Name: First Office Action-20200730 (5 pages in total), Applicant's Statements-20200826 (2 pages in total), other credentials-20200826 (3 pages in total), N-th Office Action-20201012 (3 pages in total), claims-20201113 (2 pages in total), Applicant's Statements-20201113 (2 pages in total), claims amendment sheet-20201113 (2 pages in total), other credentials-20201113 (1 page in total), N-th Office Action-20201209 (5 pages in total), claims-20201229 (2 pages in total), Applicant's Statements-20201229 (2 pages in total), claims amendment sheet-20201229 (2 pages in total), other credentials-20201229 (3 pages in total), and Notification to Grant Patent for Invention-20210219 (1 page in total)

**China National Intellectual Property Administration
November 22, 2024
Special Seal for Patent Certificate**

Certificate page 1/1

**Zhuhai CosMX Battery Co. - EX1008
Zhuhai CosMX Battery Co. v. Ningde Ampere Tech. Ltd.**



China National Intellectual Property Administration

100005

Room 2202, Building A, Wanhao Center, No. 7, Jianguomen South Avenue,
Dongcheng District Lee and Li-Leaven IPR Agency Ltd.
XIAO Fukuan (10-85187141-17)

Issuing Date:

July 30, 2020



Application No. or Patent No.: **201810640157.9**

Issuing No.: **2020072700711410**

Applicant or Patentee: Ningde Amperex Technology Limited

Title of Invention-Creation: Separator and Electrochemical Device

THE FIRST OFFICE ACTION

1. ☒ Upon the request for a substantive examination filed by the applicant, the China National Intellectual Property Administration (hereafter referred to as "CNIPA") conducts a substantive examination to the above-captioned invention patent application according to the provision of Article 35.1 of the Patent Law.
☐ According to the provision of Article 35.2 of the Patent Law, CNIPA decides on its own initiative to conduct a substantive examination to the above-captioned invention patent application.
2. ☐ The applicant requests to the filing date of:

☐ The applicant has submitted the copy of the earlier patent application documents which were first filed and certified by the competent authority.
☐ The applicant has not submitted the copy of the earlier patent application documents which were first filed and certified by the competent authority, and the claim to the right of priority is deemed not to have been made according to the provision of Article 30 of the Patent Law.
3. ☐ After examination, the amended document(s) filed on _____ by the applicant is/are not accepted because the amendment(s) do(es) not comply with the provision of Rule 51.1 of the Implementing Regulations of the Patent Law.
4. The examination is conducted on the basis of
☒ The application text as originally filed. ☐ The application text filed on the filing date of divisional application. ☐ The following application text(s):
5. ☐ The present Office Action is issued without making any searches.
☒ The present Office Action is issued with making a search.
☒ The following reference document(s) is/are cited: (the reference numeral(s) thereof will be used in the examination procedure hereafter):

No.	Reference No. or Title	Publication Date (or Filing Date of a Conflicting Application)
1	CN 105449140A	20160330

6. Concluding comments

On the description:

- ☐ The contents of the application are within the scope where no patent right shall be granted as prescribed in the provision of Article 5 of the Patent Law.

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- ☐ The description does not comply with the provision of Article 26.3 of the Patent Law.
- ☐ The description does not comply with Article 33 of the Patent Law.
- ☐ The drafting of the description does not comply with the provision of Rule 17 of the Implementing Regulations of the Patent Law.
- ☐ _____

On the Claims:

- ☐ Claim(s) _____ do(es) not comply with the provision of Article 2.2 of the Patent Law.
- ☐ Claim(s) _____ do(es) not comply with the provision of Article 9.1 of the Patent Law.
- ☐ Claim(s) _____ do(es) not possess novelty as required under Article 22.2 of the Patent Law.
- ☒ Claim(s) 1-12 do(es) not possess inventiveness as required under Article 22.3 of the Patent Law.
- ☐ Claim(s) _____ do(es) not possess practical applicability as required under Article 22.4 of the Patent Law.
- ☐ Claim(s) _____ are(is) within the scope where no patent right shall be granted as prescribed in the provision of Article 25 of the Patent law.
- ☐ Claim(s) _____ do(es) not comply with the provision of Article 26.4 of the Patent Law.
- ☐ Claim(s) _____ do(es) not comply with the provision of Article 31.1 of the Patent Law.
- ☐ Claim(s) _____ do(es) not comply with the provision of Article 33 of the Patent Law.
- ☐ Claim(s) _____ do(es) not comply with Rule 19 of the Implementing Regulations of the Patent Law.
- ☐ Claim(s) _____ do(es) not comply with Rule 20 of the Implementing Regulations of the Patent Law.
- ☐ Claim(s) _____ do(es) not comply with Rule 21 of the Implementing Regulations of the Patent Law.
- ☐ Claim(s) _____ do(es) not comply with Rule 22 of the Implementing Regulations of the Patent Law.
- ☐ _____
- ☐ The application does not comply with the provision of Article 26.5 of the Patent Law or Rule 26 of the Implementing Regulations of the Patent Law.
- ☐ The application does not comply with the provision of Article 20.1 of the Patent Law.
- ☐ The divisional application does not comply with the provision of Rule 43.1 of the Implementing Regulations of the Patent Law.

The detailed analysis on the above concluding comments is presented in the text of the Office Action.

7. Based on the above concluding comments, the examiner holds that:

- ☐ The applicant should amend the application document(s) in accordance with the requirement(s) as presented in the text of the Office Action.
- ☐ The applicant should, in the Applicant's Statements, state reasons indicating the patentability of the application and amend the defects pointed out in the text of the Office Action. Otherwise, the application shall not be granted the patent right.
- ☒ The patent application lacks substantive contents that deserve the patent right. Therefore, the application shall be rejected if the applicant fails to make Statements or the Applicant's Statements are not sufficient.
- ☐ _____

8. The applicant shall pay attention to the following matters:

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(1) It is stipulated in Articles 11 and 12 of the *Measures for the Administration of Patent Priority Examination* that time limit for the applicant to make a response to the Office Action of the invention patent is within 2 months since the date of the issuance of the notification, if the applicant makes no response overdue, CNIPA may suspend the priority examination procedure and handle it according to the ordinary procedure. That is, in accordance with Article 37 of the Patent Law, the applicant shall file its Statements within four (4) months from the date of receiving this Office Action. If the applicant does not respond before this deadline without a reasonable explanation, the application will be considered to have been withdrawn.

(2) Amendments made to the application by the applicant shall comply with Article 33 of the Patent Law and may not exceed the scope of the disclosure of the original description and list of claims. Amendments to the patent application documents shall also comply with Rule 51.3 of the Implementing Regulations of the Patent Law, and the amendments shall be prepared in accordance with the requirements in this Office Action.

(3) The applicant's Statements and/or the amended text(s) shall be mailed or delivered to the Reception Department of CNIPA. Any document(s) which are not mailed or delivered to the Reception Department do not acquire legal effect.

(4) Any applicant and/or agent shall not directly go to CNIPA to have an interview with the examiner without having an appointment.

(5) As for an invention patent application upon entry into a phase of substantive examination, the applicant could request to refund 50% fee for substantive examination of the patent application if the applicant voluntarily withdraws the present application before expiration of the time limit for responding to the First Office Action (except that a response to the First Office Action of the present application has been submitted).

9. The text of the Office Action contains 3 page(s), and has the following attachment(s):

☐ _____ copy (copies) of the cited reference(s), all together _____ page(s).

☐ _____

Examiner: CHEN Hengqiao

Contact No.: 028-62967712

Examination Department: Electricity Patent
Examination Department of Sichuan Patent
Examination Cooperation Center

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The First Office Action

Application No.: 2018106401579

The present application relates to a separator and an electrochemical device. Upon examination, following opinions are now put forward as follows:

1. The technical solution set forth in claim 1 does not involve an inventive step as defined in Article 22.3 of the Patent Law.

Claim 1 sets forth a separator. Reference Document 1 (CN105449140A) is the closest prior art and discloses a separator and a lithium-ion secondary battery, and specifically discloses the following technical features (see paragraphs [0013]-[0026], [0147], and [0155]-[0157] of the description): in the separator according to the first aspect of the present invention, the separator (equivalent to “a porous substrate”) may be selected from at least one of polyolefin, polyimide, polyurethane, and polyisocyanate; the surface of the separator may be coated with an inorganic particle coating and/or an organic particle coating (equivalent to “a porous layer, and the porous layer is disposed on a surface of the porous substrate and comprises inorganic particles”) such that the separator has a stronger heat resistance and puncture resistance; the separator has an elongation at break of 150%-900% in a transverse direction (equivalent to “an absolute plastic deformation rate in a first direction ranging from about 150% to about 900%”, i.e., disclosing a small scope of the present application) and has an elongation at break of 55%-600% in a longitudinal direction.

When the separator has higher elongations at break both in the transverse and longitudinal directions simultaneously; that is, there is a higher ratio of the elongation at break in the transverse direction (TD) of the separator to the mechanical strength of the separator in the transverse direction, and meanwhile there is a lower ratio of the mechanical strength of the separator in the longitudinal direction to the elongation at break of the separator in the longitudinal direction (MD). At this time, when the lithium-ion secondary battery is impacted by a nail and other needle-like foreign bodies, the excellent ductility of the separator in the longitudinal direction (MD) and in the transverse direction (TD) will prevent the nail and other needle-like foreign bodies from piercing the separator. Moreover, the separator may further wrap the tip of the nail to prevent it from contacting the cathode and anode, thereby facilitating the protection of the lithium-ion secondary battery.

The technical solution set forth in claim 1 differs from the technical disclosure of Reference Document 1 in that the porous layer further comprises a binder; it thus can be determined that the technical problem to solved practically thereby is how to configure a porous layer.

However, fixing inorganic particles on a porous substrate with a binder is a conventional technical means in the art.

Hence, it would have been obvious for those skilled in the art to arrive at the technical solution set forth in claim 1 on the basis of Reference Document 1 in combination with common knowledge in the art. Therefore, the technical solution set forth in claim 1 neither possesses prominent substantive features nor represents a notable progress and thus, does not involve an inventive step as defined in Article 22.3 of the Patent Law.

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2. The technical solutions set forth in claims 2-3 do not involve an inventive step as defined in Article 22.3 of the Patent Law

Claims 2-3 are all dependent of claim 1. However, Reference Document 1 further discloses (see paragraphs [0013]-[0017] of the description): the separator has an elongation at break of 150%-900% in a transverse direction (equivalent to “an absolute plastic deformation rate in a first direction ranging from 150% to about 900%”, i.e., disclosing a small scope of the present application) and has an elongation at break of 55%-600% in a longitudinal direction (equivalent to “an absolute plastic deformation rate in a second direction ranging from 55% to 600%”, partially overlapping the scope of the present application).

Therefore, insofar as claim 1 to which claims 2-3 refer is not inventive, the aforesaid dependent claims 2-3 likewise do not involve an inventive step as defined in Article 22.3 of the Patent Law.

3. The technical solutions set forth in claims 4-5 do not involve an inventive step as defined in Article 22.3 of the Patent Law.

Claims 4-5 are dependent of claims 1 and 4. Firstly, it would be well known to those skilled in the art that the relative plastic deformation rate is an index to measure the plastic deformation capacity of materials.

Secondly, Reference Document 1 has provided the technical means that when the battery is pierced by a nail or other needle-like foreign bodies, a porous substrate with good ductility is used to extend with the foreign body and wrap the foreign body by means of its good plastic deformation capacity, thus improving the safety of the battery. On this basis, to select a suitable porous substrate, those skilled in the art could readily conceive of evaluating the plastic deformation capacity of the porous substrate via such an index of relative plastic deformation rate and determining the suitable ranges of the relative plastic deformation rate in the first and/or second directions through limited number of tests.

Therefore, insofar as the claim to which claims 4-5 refer is not inventive, the aforesaid dependent claims 4-5 likewise do not involve an inventive step as defined in Article 22.3 of the Patent Law.

4. The technical solutions set forth in claims 6-10 do not involve an inventive step as defined in Article 22.3 of the Patent Law.

Claims 6-10 are all dependent of claim 1. However, Reference Document 1 has disclosed (see paragraphs [00201]-[0021] and [0025], and Table 1 of the description): the separator may be selected from at least one of polyolefin, polyimide, polyurethane, and polyisocyanate; the polyolefin may be selected from at least one of polypropylene (PP) and polyethylene (PE);

inorganic particles in the inorganic particle coating may be selected from at least one of aluminium oxide, silicon dioxide, titanium dioxide, cerium dioxide, calcium carbonate, calcium oxide, zinc oxide, magnesium oxide, cerium titanate, calcium titanate, barium titanate, lithium phosphate, lithium titanium phosphate, lithium aluminum titanium phosphate, lithium nitride, and lanthanum lithium titanate;

as can be seen from Example 1 of Table 1, the separator has a thickness of 16 μm (disclosing a

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small scope of the present application).

In addition, hafnium dioxide, tin oxide, nickel oxide, zirconia, yttria, silicon carbide, boehmite, aluminum hydroxide, magnesium hydroxide, calcium hydroxide, and barium sulfate are common inorganic particles with electrochemical stability in the art. Using one or more of the aforesaid materials for replacement or being in combination with one or more inorganic particles in Reference Document 1 as inorganic particles in the porous layer is a conventional selection to those skilled in the art.

Moreover, the vinylidene fluoride-hexafluoropropylene copolymer, a vinylidene fluoride-trichloroethylene copolymer, polymethyl methacrylate, polyacrylic acid, polyacrylate, polyacrylonitrile, polyvinyl pyrrolidone, polyvinyl acetate, ethylene-vinyl acetate copolymer, polyimide, polyethylene oxide, cellulose acetate, cellulose acetate butyrate, cellulose acetate propionate, cyanoethyl amylopectin, cyanoethyl polyvinyl alcohol, cyanoethyl cellulose, cyanoethyl sucrose, amylopectin, sodium carboxymethyl cellulose, lithium carboxymethyl cellulose, acrylonitrile-styrene-butadiene copolymer, polyvinyl alcohol, polyvinyl ether, polytetrafluoroethylene, polyhexafluoropropylene, styrene-butadiene copolymer, and polyvinylidene fluoride are common binder materials for a separator. Using one or more of the aforesaid materials as a binder of the porous layer to fix inorganic particles on the porous substrate is a conventional selection to those skilled in the art.

Designing the porous substrate to include a polymer film, a multilayer polymer film or a nonwoven fabric is a conventional configuration to those skilled in the art. Furthermore, polyethylene terephthalate, polybutylene terephthalate, polyphenylene terephthamide, polyester, polyacetal, polyamide, polycarbonate, polyetheretherketone, polyaryletherketone, polyetherimide, polyamideimide, polybenzimidazole, polyethersulfone, polyphenylene ether, cyclic olefin copolymer, polyphenylene sulfide, and polyethylene naphthalene are also all common separator materials in the art. Using one or more of the aforesaid materials to manufacture a polymer film, a multilayer polymer film or a nonwoven fabric is also a conventional selection in the art.

It is also well known to those skilled in the art that on the one hand, the porosity of separator will affect the internal resistance of a battery, on the other hand, will affect the strength of the separator. Specifically, the lower the porosity is, the slower the ionic mobility is, thus showing an increased internal resistance; however, the separator is less vulnerable to be destroyed with the increase of its strength; the higher the porosity is, the faster the ionic mobility is, the smaller the internal resistance is, and the less stable the strength of the separator is. Therefore, those skilled in the art could determine a suitable porosity based on the practical demands for the separator (e.g., demands for strength and ion transmittance) through limited number of tests.

Therefore, insofar as the claim to which claims 6-10 refer is not inventive, the aforesaid dependent claims 6-10 likewise do not involve an inventive step as defined in Article 22.3 of the Patent Law.

5. The technical solution set forth in claim 11 does not involve an inventive step as defined in Article 22.3 of the Patent Law.

Claim 11 sets forth an electrochemical device. Reference Document 1 (CN105449140A) is the closest prior art and discloses a separator and a lithium-ion secondary battery (equivalent to an

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“electrochemical device”), and specifically discloses the following technical features (see paragraph [0026] of the description):

the lithium-ion secondary battery (equivalent to the “electrochemical device”) comprises a cathode, an anode, a separator spaced between the cathode and the anode, and an electrolyte solution.

In addition, based on the comments on the preceding claim, the separator of the claims 1-10 does not involve an inventive step. Therefore, when the separator of claims 1-10 is selectively adopted in the electrochemical device of claim 11, claim 11 neither possesses prominent substantive features nor represents notable progress, and thus does not involve an inventive step as provided in Article 22.3 of the Patent Law.

12. The technical solution set forth in claim 12 does not involve an inventive step as defined in Article 22.3 of the Patent Law.

Claim 12 cites claim 11. However, Reference Document 1 has disclosed a lithium-ion secondary battery (equivalent to “the electrochemical device comprises lithium ion batteries”).

Therefore, insofar as the claim to which claim 12 refers is not inventive, the aforesaid dependent claim 12 likewise does not involve an inventive step as defined in Article 22.3 of the Patent Law.

On the basis of the above reasons, the present application may be not granted a patent right since no claim involves an inventive step. Moreover, the present application does not recite any substantive patentable content in the description, so the present application yet does not have a prospect of being granted a patent right. If the applicant is unable to provide sufficient reasons for that the present application involves an inventive step within the response time limit specified in the present Office Action, the present application will be finally rejected.

Examiner: CHEN Hengqiao

Code: 629869

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deemed not to have been submitted, unless otherwise specified.

Applicant's Statements

Please fill in the columns of this table according to the "notes"

① Patent Application or Patent	Application No. or Patent No.: 2018106401579 Title of Invention: Separator And Electrochemical Device Applicant or Patentee (*Fill in the first signatory applicant) Ningde AmpereX Technology Ltd
② Matters: Please use the Statements (concerning fees) regarding the statement of fees Select one of the following options only: ☒ State the opinions in regard to the First Office Action (Issuing No.: 2020072700711410) issued by the China National Intellectual Property Administration on July 30, 2020. ☐ Supplement the opinions in regard to _____ Office Action (Issuing No.: _____) issued by the China National Intellectual Property Administration on MM DD, YY. ☐ Propose amendments voluntarily (in accordance with Rules 51.1 and 51.2 of the Implementing Regulations of the Patent Law). ☐ Others.	③ Opinions stated: Please see the appendix!
④ List of the appendix [Appendix name] Appendix of the Applicant's Statements [Appendix attribute] Electronic file Filed credentials number: _____.	⑤ Signed or stamped by the parties involved or patent agency Lee and Li-Leaven IPR Agency Ltd. MY DD YY
⑥ Comments of CNIPA August 26, 2020	

20200826



2018106401579

Applicant's Statements

Your Respected Examiner,

Many thanks for your careful and meticulous examination to the present application! After studying and reading the examination comments intensively, the applicant put forward the following Statements:

Claim 1 of the present application recites “the porous substrate has an absolute plastic deformation rate in the first direction ranging from about 40% to about 1800%”. The absolute plastic deformation rate recited in claim 1 of the present application refers to the absolute plastic deformation rate of the porous substrate instead of the overall absolute plastic deformation rate of the separator formed by disposing a layer (e.g., a porous layer) on the porous substrate. The layer disposed on the porous substrate will enable the absolute plastic deformation rate of the porous substrate to change; therefore, the absolute plastic deformation rate of the porous substrate is different from the overall absolute plastic deformation rate of the separator.

In addition, the specification of the present application discloses the following test method for the “absolute plastic deformation rate” (please see paragraphs [0075]-[0078] of the specification in the publication CN108807821A of the present application, corresponding to lines 14-67 on column 4 and lines 1-17 on column 5 of the specification in its US counterpart US10964927):

“(1) Test Method for the Plastic Deformation Rate of the Porous Substrate

The porous substrate was cut into strips having a size of 100 mm x 20 mm along the first direction and the second direction. A region having a length of $L_0=40$ mm was arbitrarily selected in the range of 100 mm in the length direction of the strip, and marklines were made at two ends of the region. An area between the marklines was stretched to break by a high-speed universal tensile testing machine at a speed of 50 mm/min. The maximum length L_1 reached by the stretching was recorded, and then the broken porous substrate was docked along the fracture and flattened to test the length L_2 in a natural state. The absolute plastic deformation rate ϵ_1 and the relative plastic deformation rate ϵ_2 of the porous substrate in a certain direction were calculated by the following formula:

$$\epsilon_1 = (L_2 - L_0) / L_0 \times 100\%$$

$$\epsilon_2 = (L_2 - L_0) / (L_1 - L_0) \times 100\%$$

The test method is shown in FIG. 1:

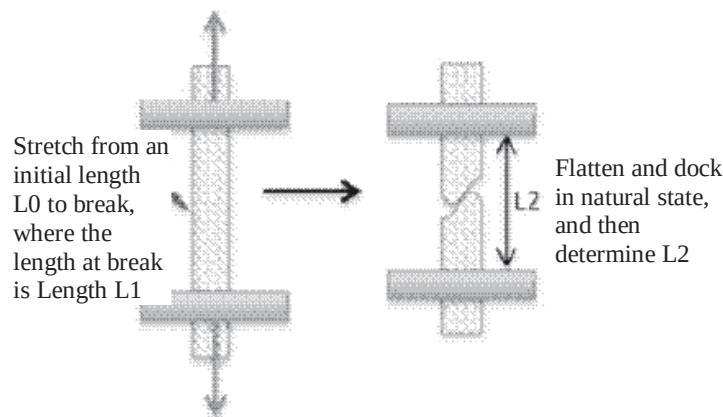


FIG. 1



The present application further discloses the following content (please see paragraph [0026] of the specification in the publication of the present application, corresponding to lines 22-40 on column 4 of the specification in its US counterpart US10964927):

“The porous substrate is subjected to both elastic deformation and plastic deformation during the tensile test. The amount of elastic deformation= $L1-L2$, the amount of plastic deformation= $L2-L0$, and the total amount of deformation=the amount of elastic deformation + the amount of plastic deformation. Plastic deformation is a permanent deformation that does not bounce back.”

As such, after stretching to break, the porous substrate may bounce back or be subjected to other elastic deformation. The absolute plastic deformation rate in the present application reflects the permanent deformation of the porous substrate and thus, the elastic deformation portion has been excluded.

However, Reference Document 1 discloses the following test method for the elongation at break of a separator:

[0146] (1) Test for the elongation at break and mechanical strength of the separator

[0147] The separators in Comparative Examples 1-2 and Examples 1-17 were subjected to tensile test; 20 strips of separators were taken each group; 10 strips were used to test the elongation at break and mechanical strength of the separators in the transverse direction (TD), and another 10 strips were used to test the elongation at break and mechanical strength of the separators in the longitudinal direction (MD). The test process is as follows: the separator was firstly cut into a sample having a width of 14.5 mm and a length of 50 mm along the transverse direction (TD), and then stretched by a high-speed universal tensile testing machine at a constant rate of 50 mm/min; tensile strength at break and mechanical strength of the separator in the transverse direction (TD) were recorded to obtain the elongation at break and mechanical strength of the separator in the transverse direction (TD). Afterwards, the separator was cut into a sample having a width of 14.5 mm and a length of 50 mm along the longitudinal direction (MD), and then stretched by a high-speed universal tensile testing machine at a constant rate of 50 mm/min; tensile strength at break and mechanical strength of the separator in the longitudinal direction (MD) were recorded to obtain the elongation at break and mechanical strength of the separator in the longitudinal direction (MD).

According to the aforesaid method, Reference Document 1 merely measures the tensile length (equivalent to “L1” of the present application) of the separator when stretched to break, but does not measure the length of the broken separator after being docked along the fracture and flattened in a natural state (i.e., “L2” of the present application). In fact, the elongation at break disclosed in Reference Document 1 is equivalent to $(L1-L0)/L0 \times 100\%$ (namely, inclusive of the two parts of elastic deformation and plastic deformation), it is obviously different from the absolute plastic deformation rate $(L2-L0)/L0 \times 100\%$ in the present application.

Therefore, Reference Document 1 does not disclose the absolute plastic deformation rate recited in claim 1 of the present application. Moreover, based on the elongation at break disclosed in Reference Document 1, those skilled in the art likewise could not calculate or deduce the absolute plastic deformation rate of the separator, let alone the absolute plastic deformation rate of the porous substrate in the separator.

On the basis of the above reasons, except the distinguishing technical feature (i.e., the porous layer further comprises a binder) confirmed in the First Office Action, claim 1 of the present application further differs from Reference Document 1 in that: the porous substrate has an absolute plastic deformation rate in a first direction ranging from about 40% to about 1800%. The distinguishing technical features between claim 1 of the present application and Reference Document 1 are not completely confirmed in the examination comments, the conclusion on inventive step is thus incomplete and incorrect.



In addition, the separator in Reference Document 1 can rapidly extend and stretch out under impact, nail penetration, side extrusion, and other abuses and thus can prevent the direct contact between the cathode and the anode caused by the brittle tear of the separator (please see paragraph [0009] of the specification in Reference Document 1). That is, the separator in Reference Document 1 has a puncture resistance and thus, is harder to be torn. However, Reference Document 1 does not consider the conditions of the separator after being torn under impact, nail penetration, side extrusion, and other abuses. For example, there are two stages of the separator in the process of nail penetration, the first stage is the process that the separator extends along with the nail, and the nail is wrapped by the separator to prevent short circuit caused by the contact between the cathode and the anode. The second stage is the process that the separator in the puncture position bounces back under the action of force after the separator is completely pierced by the nail; with the increase of the resilience value, there are more exposed portions of the nail, then the cathode and the anode will contact with each other to cause short circuit via the exposed nail. Obviously, Reference Document 1 merely considers the first stage, but does not consider the bouncing back of the separator in the second stage. That is, no matter how the separator extends along with the nail in the first stage, most of the separator will bounce back after being completely pierced by the nail if the plastic deformation rate is too small (similar to the circumstance that a rubber band is broken under the action of tensile force), which will also cause short circuit due to the contact between the cathode and the anode.

In the present application, the porous substrate has a higher plastic deformation rate. As stated in the specification of the present application, the porous substrate has a large plastic deformation under external force, so that when the separator is pieced by a nail, the separator will have a large extensional deformation with the nail and bounces back less (similar to the circumstance that plasticine is broken under the action of tensile force), thereby maintaining the effect in isolating the cathodes and anodes, preventing the internal short circuit in the lithium ion battery, and improving the safety of the lithium ion battery (please see paragraph [0027] of the specification in Reference Document 1, corresponding to lines 41-47 on column 4 of the specification in its US counterpart US10964927). That is, the nail can be still wrapped by the separator of the present application after being pierced by the nail, thus preventing short circuit.

The present application is not obvious over Reference Document 1 at least based on the above reasons and thus, involves an inventive step.

Could you take the aforesaid opinions into full consideration and continue to examine the present application? If you think there are any problems in the present application, could you give us another opportunity to amend or state opinions? Welcome to contact the agent at any time (010-85187141-850). Thanks a lot!



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Dongcheng District Lee and Li-Leaven IPR Agency Ltd.
XIAO Fukuan (10-85187141-17)



Issuing Date:

October 12, 2020

Application No. or Patent No.: **201810640157.9**

Issuing No.: **2020093001335790**

Applicant or Patentee: Ningde Amperex Technology Ltd

Title of Invention: Separator And Electrochemical Device

The Second Office Action

1. ☒ The examiner has received the Applicant's Statements submitted by the applicant on August 26, 2020. On this basis, the examiner continues to conduct a substantive examination on the above-captioned application.
☐ The examiner continues to conduct a substantive examination on the above-captioned patent application according to the Reexamination Decision made by CNIPA on MM DD, YY.
☐ _____
2. ☐ After examination, the amended document(s) filed on _____ by the applicant is/are not accepted because said amendment(s) do(es) not comply with the provision of Rule 51.3 of the Implementing Regulations of the Patent Law.
3. The continued examination is conducted on the basis of:
☐ The amended documents attached to the above Applicant's Statements.
☐ The application documents based on which the foregoing office action is issued and the replacement sheet of the amended documents attached to the above Applicant's Statements.
☒ The application documents based on which the foregoing office action is issued.
☐ The application documents determined in the above Reexamination Decision.
☐ _____
4. ☒ No new reference document(s) is/are cited in the office action.
☐ The following reference document(s) is/are cited in the office action: (the reference numeral(s) thereof will be used in the examination procedure hereafter)

No.	Reference No. or Title	Publication Date (or Filing Date of a Conflicting Application)
-----	------------------------	---

5. Concluding comments

On the description:

- ☐ The contents of the application are within the scope where no patent right shall be granted as prescribed in the provision of Article 5 of the Patent Law.
- ☐ The description does not comply with the provision of Article 26.3 of the Patent Law.
- ☐ The amendment(s) made to the description does not comply with the provision of Article 33 of the Patent Law.
- ☐ The drafting of the description does not comply with the provision of Rule 17 of the Implementing Regulations of the Patent Law.
- ☐ _____

On the Claims:

210403 For paper applications, replies should be sent to: The Filing Office, Patent Office, China National Intellectual
2019.4 Property Administration, 6 Xitucheng Road, Jimen Bridge, Haidian, Beijing, 100088
For electronic applications, related documents should be submitted by means of the electronic patent application system in the form of electronic documents. The application documents filed by paper or other forms are deemed not to have been submitted, unless otherwise specified.



China National Intellectual Property Administration

- ☐ Claim(s) _____ do(es) not comply with the provision of Article 2.2 of the Patent Law.
- ☐ Claim(s) _____ do(es) not comply with the provision of Article 9.1 of the Patent Law.
- ☐ Claim(s) _____ do(es) not possess novelty as required under Article 22.2 of the Patent Law.
- ☐ Claim(s) _____ do(es) not possess inventiveness as required under Article 22.3 of the Patent Law.
- ☐ Claim(s) _____ do(es) not possess practical applicability as required under Article 22.4 of the Patent Law.
- ☐ Claim(s) _____ are(is) within the scope where no patent right shall be granted as prescribed in the provision of Article 25 of the Patent law.
- ☒ Claim(s) 1 does not comply with the provision of Article 26.4 of the Patent Law.
- ☐ Claim(s) _____ do(es) not comply with the provision of Article 31.1 of the Patent Law.
- ☐ Claim(s) _____ do(es) not comply with the provision of Article 33 of the Patent Law.
- ☐ Claim(s) _____ do(es) not comply with Rule 19 of the Implementing Regulations of the Patent Law.
- ☐ Claim(s) _____ do(es) not comply with Rule 20 of the Implementing Regulations of the Patent Law.
- ☐ Claim(s) _____ do(es) not comply with Rule 21 of the Implementing Regulations of the Patent Law.
- ☐ Claim(s) _____ do(es) not comply with Rule 22 of the Implementing Regulations of the Patent Law.
- ☐ _____
- ☐ The application does not comply with the provision of Article 26.5 of the Patent Law or Rule 26 of the Implementing Regulations of the Patent Law.
- ☐ The application does not comply with the provision of Article 20.1 of the Patent Law.
- ☐ The divisional application does not comply with the provision of Rule 43.1 of the Implementing Regulations of the Patent Law.
- The detailed analysis on the above concluding comments is presented in the text of the Office Action.
6. Based on the above concluding comments, the examiner holds that:
- ☐ The applicant should amend the application document(s) in accordance with the requirement(s) as presented in the text of the Office Action.
- ☒ The applicant should, in the Statements, state reasons indicating the patentability of the application and amend the defects pointed out in the text of the Office Action. Otherwise, the application shall not be granted the patent right.
- ☐ The patent application lacks substantive contents that deserve the patent right. Therefore, the application shall be rejected if the applicant fails to make Statements or the Applicant's Statements are not sufficient.
- ☐ _____
7. The applicant shall pay attention to the following matters:
- (1) It is stipulated in Articles 11 and 12 of the *Administrative Measures on Prioritized Examination of Patent Applications* that time limit for the applicant to make a response to the Office Action of the invention patent is within 2 months since the date of the issuance of the notification, if the applicant makes no response overdue, CNIPA may suspend the prioritized examination procedure and handle it according to the ordinary procedure. That is, in accordance with Article 37 of the Patent Law, the applicant shall file the Statements within four (2) months from the date of receiving this Office Action. If the applicant does not make a

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China National Intellectual Property Administration

response before this deadline without a reasonable explanation, the application will be considered to have been withdrawn.

(2) Amendments made to the application by the applicant shall comply with Article 33 of the Patent Law and may not exceed the scope of the disclosure of the original description and list of claims. Amendments to the patent application documents shall also comply with Rule 51.3 of the Implementing Regulations of the Patent Law, and the amendments shall be prepared in accordance with the requirements in this Office Action.

(3) The Applicant's Statements and/or the amended text(s) shall be mailed or delivered to the Reception Department of CNIPA. Any document(s) which are not mailed or delivered to the Reception Department do not acquire legal effect.

(4) Any applicant and/or agent shall not directly go to CNIPA to have an interview with the examiner without having an appointment.

8. The text of this Office Action contains 1 page(s), and has the following attachment(s):

☐ _____ copy (copies) of the cited reference(s), all together _____ page(s).

☐ _____

Examiner: CHEN Hengqiao Contact No.: 028-62967712 Examination Department: Electricity Patent
Examination Department of Sichuan Patent
Examination Cooperation Center

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deemed not to have been submitted, unless otherwise specified.



The Second Office Action

Application No.: 2018106401579

The applicant filed the Applicant's Statements on August 26, 2020. After reading the aforesaid documents, the examiner proceeded to examine this case and put forward the following examination opinions again:

1. The technical solution set forth in claim 1 does not comply with the provision of Article 26.4 of the Patent Law.

Claim 1 defines the porous substrate by “the porous substrate has an absolute plastic deformation rate in the first direction ranging from about 40% to about 1800%”. However, the “absolute plastic deformation rate” is not explicitly defined in the art. Those skilled in the art could not make clear its specific meaning. In addition, it would be also well known to those skilled in the art that parameters for representing the mechanical properties of a material are determined on the basis of the specific test method. Moreover, those skilled in the art likewise do not know the specific determination method of the “absolute plastic deformation rate”. Therefore, claim 1 is not clear as defined in Article 26.4 of the Patent Law.

Furthermore, claim 1 merely recites the basic composition and mechanical property features of the separator, covering all the separators able to meet the aforesaid features and prepared by any raw materials (including major materials, additives, solvents, etc.) and preparation method defined above. However, the examples recited in the application documents merely give the porous substrate prepared by a PE powder with a molecular weight of 1,000,000 as a raw material, and the method for obtaining porous substrates with different plastic deformation rates by adjusting the stretching ratio in the longitudinal and transverse directions (stretching ratio). Based on the disclosure of the specification, those skilled in the art could hardly expect whether porous substrates with different plastic deformation rates can be also obtained by adjusting the stretching ratio in the longitudinal and transverse directions (stretching ratio) for other porous substrates with different molecular weight and/or major material. Moreover, those skilled in the art could hardly expect whether there are other preparation methods to achieve the physical properties defined by the claims, either.

Therefore, the parameters defined by claim 1 are achieved on the basis of specific raw materials and preparation methods. Based on the disclosure of the specification, those skilled in the art could not make sure whether the parameters can be achieved by other substitute modes not mentioned in the specification other than the raw materials and preparation methods recited in the examples of the specification of the present application, thereby meeting the definitions of the claims, and solving the technical problem of the present application to achieve the same technical effect. Therefore, claim 1 is not based on the specification, i.e., cannot be supported by the specification as provided in Article 26.4 of the Patent Law.

On the basis of the above reasons, the present application has been not yet granted a patent right according to the current text. The applicant shall make a response to the defects put forward in the Office Action within the response time limit as designated in the Office Action, and amend the patent application documents where necessary; otherwise, the present application is hard to be granted. Any amendment made by the applicant to the application document shall not go beyond the scope of the disclosure in the original specification and Claims, so as to comply with the provision of Article 33 of the Patent Law.

Examiner: CHEN Hengqiao

Code: 629869

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Applicant's Statements

Claims

1. A separator, comprising:
a porous substrate; and
a porous layer;
wherein the porous layer is disposed on a surface of the porous substrate and comprises inorganic particles and a binder; and the porous substrate has an absolute plastic deformation rate in a first direction ranging from about 40% to about 1800%, and wherein the absolute plastic deformation rate is calculated according to an equation $(L2-L0)/L0 \times 100\%$, where L0 refers to a length of the porous substrate before stretching and L2 refers to a length of the porous substrate after the porous substrate is stretched to breakage and docked along the fracture caused by the breakage and flattened.
2. The separator according to claim 1, wherein the porous substrate has an absolute plastic deformation rate in a second direction ranging from about 60% to about 1800%.
3. The separator according to claim 1, wherein the porous substrate has at least one of the following properties:
an absolute plastic deformation rate in the first direction ranging from about 40% to about 1600%; and
an absolute plastic deformation rate in the second direction ranging from about 70% to about 1600%.
4. The separator according to claim 1, wherein the porous substrate has at least one of the following properties:
a relative plastic deformation rate in the first direction ranging from about 50% to about 100%;
and
a relative plastic deformation rate in the second direction ranging from about 60% to about 100%.
5. The separator according to claim 4, wherein the porous substrate has at least one of the following properties:
a relative plastic deformation rate in the first direction ranging from about 65% to about 90%;
and
a relative plastic deformation rate in the second direction ranging from about 75% to about 90%.
6. The separator according to claim 1, wherein the binder comprises at least one selected from the group consisting of a vinylidene fluoride-hexafluoropropylene copolymer, a vinylidene fluoride-trichloroethylene copolymer, polymethyl methacrylate, polyacrylic acid, polyacrylate, polyacrylonitrile, polyvinyl pyrrolidone, polyvinyl acetate, an ethylene-vinyl acetate copolymer, polyimide, polyethylene oxide, cellulose acetate, cellulose acetate butyrate, cellulose acetate propionate, cyanoethyl amylopectin, cyanoethyl polyvinyl alcohol, cyanoethyl cellulose, cyanoethyl sucrose, amylopectin, sodium carboxymethyl cellulose, lithium carboxymethyl cellulose, an acrylonitrile-styrene-butadiene copolymer, polyvinyl alcohol, polyvinyl ether, polytetrafluoroethylene, polyhexafluoropropylene, a styrene-butadiene copolymer, and polyvinylidene fluoride.
7. The separator according to claim 1, wherein the inorganic particles comprise at least one selected from the group consisting of alumina, silica, magnesia, titanium oxide, hafnium dioxide, tin oxide, cerium dioxide, nickel oxide, zinc oxide, calcium oxide, zirconia, yttria, silicon carbide, boehmite, aluminum hydroxide, magnesium hydroxide, calcium hydroxide and barium sulfate.
8. The separator according to claim 1, wherein the porous substrate comprises a polymer film, a multilayer polymer film or a nonwoven fabric, wherein the polymer film, the multilayer

Applicant's Statements

polymer film or the nonwoven fabric is formed by any one or more of the following polymers: polyethylene, polypropylene, polyethylene terephthalate, polybutylene terephthalate, polyphenylene terephthamide, polyester, polyacetal, polyamide, polycarbonate, polyimide, polyetheretherketone, polyaryletherketone, polyetherimide, polyamideimide, polybenzimidazole, polyethersulfone, polyphenylene ether, a cyclic olefin copolymer, polyphenylene sulfide or polyethylene naphthalene.

9. The separator according to claim 1, wherein the porous substrate has a thickness ranging from about 1 to about 40 μm .

10. The separator according to claim 1, wherein the porous substrate has a porosity ranging from about 10% to about 70%.

11. An electrochemical device, comprising:
a cathode;

an anode; and

the separator according to claims 1-10.

12. The electrochemical device according to claim 11, wherein the electrochemical device comprises lithium ion batteries.

Applicant's Statements

Please fill in the columns of this table according to the “notes”

① Patent Application or Patent	Application No. or Patent No.: 2018106401579 Title of Invention: Separator And Electrochemical Device Applicant or Patentee (*Fill in the first signatory applicant) Ningde Ampere Technology Ltd
② Matters: Please use the Statements (concerning fees) regarding the statement of fees Select one of the following options only: ☒ State the opinions in regard to the Second Office Action (Issuing No.: 2020093001335790) issued by the China National Intellectual Property Administration on October 12, 2020. ☐ Supplement the opinions in regard to _____ Office Action (Issuing No.: _____) issued by the China National Intellectual Property Administration on MM DD, YY. ☐ Propose amendments voluntarily (in accordance with Rules 51.1 and 51.2 of the Implementing Regulations of the Patent Law). ☐ Others.	
③ Opinions stated: Please see the appendix!	
④ List of the appendix [Appendix name] Appendix of the Applicant's Statements, amendment sheet of the claims, and replacement sheet of the claims [Appendix attribute] Electronic file Filed credentials number: _____.	
⑤ Signed or stamped by the parties involved or patent agency Lee and Li-Leaven IPR Agency Ltd. November 13, 2020	⑥ Comments of CNIPA MY DD YY

20201113

Applicant's Statements



2018106401579

Claims

1. A separator, comprising:

a porous substrate; and

a porous layer;

wherein the porous layer is disposed on a surface of the porous substrate and comprises inorganic particles and a binder; and the porous substrate has an absolute plastic deformation rate in a first direction ranging from about 40% to about 1800%, and wherein the absolute plastic deformation rate is calculated according to an equation $(L2-L0)/L0 \times 100\%$, where L0 refers to a length of the porous substrate before stretching and L2 refers to a length of the porous substrate after the porous substrate is stretched to breakage and docked along the fracture caused by the breakage and flattened.

2. The separator according to claim 1, wherein the porous substrate has an absolute plastic deformation rate in a second direction ranging from about 60% to about 1800%.

3. The separator according to claim 1, wherein the porous substrate has at least one of the following properties:

an absolute plastic deformation rate in the first direction ranging from about 40% to about 1600%; and

an absolute plastic deformation rate in the second direction ranging from about 70% to about 1600%.

4. The separator according to claim 1, wherein the porous substrate has at least one of the following properties:

a relative plastic deformation rate in the first direction ranging from about 50% to about 100%; and

a relative plastic deformation rate in the second direction ranging from about 60% to about 100%.

5. The separator according to claim 4, wherein the porous substrate has at least one of the following properties:

a relative plastic deformation rate in the first direction ranging from about 65% to about 90%; and

a relative plastic deformation rate in the second direction ranging from about 75% to about 90%.

6. The separator according to claim 1, wherein the binder comprises at least one selected from the group consisting of a vinylidene fluoride-hexafluoropropylene copolymer, a vinylidene fluoride-trichloroethylene copolymer, polymethyl methacrylate, polyacrylic acid, polyacrylate, polyacrylonitrile, polyvinyl pyrrolidone, polyvinyl acetate, an ethylene-vinyl acetate copolymer, polyimide, polyethylene oxide, cellulose acetate, cellulose acetate butyrate, cellulose acetate propionate, cyanoethyl amylopectin, cyanoethyl polyvinyl alcohol, cyanoethyl cellulose, cyanoethyl sucrose, amylopectin, sodium carboxymethyl cellulose, lithium carboxymethyl cellulose, an acrylonitrile-styrene-butadiene copolymer, polyvinyl alcohol, polyvinyl ether, polytetrafluoroethylene, polyhexafluoropropylene, a styrene-butadiene copolymer, and polyvinylidene fluoride.

7. The separator according to claim 1, wherein the inorganic particles comprise at least one selected from the group consisting of alumina,

silica, magnesia, titanium oxide, hafnium dioxide, tin oxide, cerium dioxide, nickel oxide, zinc oxide, calcium oxide, zirconia, yttria, silicon carbide, boehmite, aluminum hydroxide, magnesium hydroxide, calcium hydroxide and barium sulfate.

8. The separator according to claim 1, wherein the porous substrate comprises a polymer film, a multilayer polymer film or a nonwoven fabric, wherein the polymer film, the multilayer polymer film or the nonwoven fabric is formed by any one or more of the following polymers: polyethylene, polypropylene, polyethylene terephthalate, polybutylene terephthalate, polyphenylene terephthamide, polyester, polyacetal, polyamide, polycarbonate, polyimide, polyetheretherketone, polyaryletherketone, polyetherimide, polyamideimide, polybenzimidazole, polyethersulfone, polyphenylene ether, a cyclic olefin copolymer, polyphenylene sulfide or polyethylene naphthalene.

9. The separator according to claim 1, wherein the porous substrate has a thickness ranging from about 1 to about 40 μm .

10. The separator according to claim 1, wherein the porous substrate has a porosity ranging from about 10% to about 70%.

11. An electrochemical device, comprising:

a cathode;

an anode; and

the separator according to claims 1-10.

12. The electrochemical device according to claim 11, wherein the electrochemical device comprises lithium ion batteries.



Your Respected Examiner,

Many thanks for your careful and meticulous examination to the present application! After studying and reading the examination comments intensively, the applicant amended the claims and stated the following opinions:

1. Issue concerning clarity

The applicant further defines the test method for the absolute plastic deformation rate in claim 1, i.e., “wherein the absolute plastic deformation rate is calculated according to an equation $(L2-L0)/L0 \times 100\%$, and where L0 refers to a length of the porous substrate before stretching, L2 refers to a length of the porous substrate after the porous substrate is stretched to breakage and docked along the fracture caused by the breakage and flattened”. Basis for the amendment is referring to paragraphs [0026]-[0028] of the specification in the publication CN108807821A of the present application (corresponding to lines 22-52 on column 4 of the specification in its US counterpart US10964927).

Therefore, the amended claim 1 has a clear scope of protection and thus, complies with the provision of Article 26.4 of the Patent Law.

2. Issue concerning lack of support

Even though the present application merely discloses the preparation of a porous substrate using a PE having a molecular weight of 1,000,000, it should be known to those skilled in the art that the plastic deformation rate of the porous substrate is mainly affected by the stretching conditions in the process of preparation. Given that the specification of the present application has revealed the preparation process, and the examples of the present application have indicated the components and molecular weight of the selected raw materials, it would be known to those skilled in the art that for porous substrates with different materials and molecular weight, their desired absolute plastic deformation rates can be obtained by changing a stretching ratio.

Therefore, the amended claim 1 can be supported by the specification as defined in Article 26.4 of the Patent Law.

Could you take the aforesaid opinions into full consideration and continue to examine the amended text of the present application? If you think there are any problems in the present application, could you give us another opportunity to amend or state opinions? Welcome to contact the agent at any time (010-85187141-850). Thanks a lot!



CHINA NATIONAL INTELLECTUAL PROPERTY ADMINISTRATION

100005

Room 2202, Building A, Beijing Pudi Hotel, No. 7, Jianguomen South Avenue, Dongcheng District Lee and Li-Leaven IPR Agency Ltd.
XIAO Fukuan (10-85187141-17)



Issuing Date:

December 09, 2020

Application No. or Patent No.: **201810640157.9**

Issuing No.: **2020120400777040**

Applicant or Patentee: Ningde Amperex Technology Ltd

Title of Invention-Creation: Separator and Electrochemical Device

The Third Office Action

1. ☒The examiner has received the Applicant's Statements submitted by the applicant on November 13, 2020. On this basis, the examiner continues to conduct a substantive examination on the above-captioned application.
☐The examiner continues to conduct a substantive examination on the above-captioned patent application according to the Reexamination Decision made by CNIPA on MM DD, YY.
☐_____
2. ☐After examination, the amended document(s) filed on _____ by the applicant is/are not accepted because said amendment(s) do(es) not comply with the provision of Rule 51.3 of the Implementing Regulations of the Patent Law.
3. The continued examination is conducted on the basis of:
☐The amended documents attached to the above Applicant's Statements.
☒The application documents based on which the foregoing office action is issued and the replacement sheet of the amended documents attached to the above Applicant's Statements.
☐The application documents based on which the foregoing office action is issued.
☐The application documents determined in the above Reexamination Decision.
☐_____
4. ☒No new reference document(s) is/are cited in the office action.
☐The following reference document(s) is/are cited in the office action: (the reference numeral(s) thereof will be used in the examination procedure hereafter)

No.	Reference No. or Title	Publication Date (or Filing Date of a Conflicting Application)
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5. Concluding comments
On the description:
☐The contents of the application are within the scope where no patent right shall be granted as prescribed in the provision of Article 5 of the Patent Law.
☐The description does not comply with the provision of Article 26.3 of the Patent Law.
☐The amendment(s) made to the description does not comply with the provision of Article 33 of the Patent Law.
☐The drafting of the description does not comply with the provision of Rule 17 of the Implementing Regulations of the Patent Law.
☐_____

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On the Claims:

☐ Claim(s) _____ do(es) not comply with the provision of Article 2.2 of the Patent Law.
☐ Claim(s) _____ do(es) not comply with the provision of Article 9.1 of the Patent Law.
☐ Claim(s) _____ do(es) not possess novelty as required under Article 22.2 of the Patent Law.

☒ Claim(s) 1-12 do(es) not possess inventiveness as required under Article 22.3 of the Patent Law.

☐ Claim(s) _____ do(es) not possess practical applicability as required under Article 22.4 of the Patent Law.

☐ Claim(s) _____ are(is) within the scope where no patent right shall be granted as prescribed in the provision of Article 25 of the Patent law.

☐ Claim(s) _____ do(es) not comply with the provision of Article 26.4 of the Patent Law.

☐ Claim(s) _____ do(es) not comply with the provision of Article 31.1 of the Patent Law.

☐ Claim(s) _____ do(es) not comply with the provision of Article 33 of the Patent Law.

☐ Claim(s) _____ do(es) not comply with Rule 19 of the Implementing Regulations of the Patent Law.

☐ Claim(s) _____ do(es) not comply with Rule 20 of the Implementing Regulations of the Patent Law.

☐ Claim(s) _____ do(es) not comply with Rule 21 of the Implementing Regulations of the Patent Law.

☐ Claim(s) _____ do(es) not comply with Rule 22 of the Implementing Regulations of the Patent Law.

☐ _____

☐ The application does not comply with the provision of Article 26.5 of the Patent Law or Rule 26 of the Implementing Regulations of the Patent Law.

☐ The application does not comply with the provision of Article 20.1 of the Patent Law.

☐ The divisional application does not comply with the provision of Rule 43.1 of the Implementing Regulations of the Patent Law.

The detailed analysis on the above concluding comments is presented in the text of the Office Action.

6. Based on the above concluding comments, the examiner holds that:

☐ The applicant should amend the application document(s) in accordance with the requirement(s) as presented in the text of the Office Action.

☐ The applicant should, in the Applicant's Statements, state reasons indicating the patentability of the application and amend the defects pointed out in the text of the Office Action. Otherwise, the application shall not be granted the patent right.

☒ The patent application lacks substantive contents that deserve the patent right. Therefore, the application shall be rejected if the applicant fails to make Applicant's Statements or the Applicant's Statements are not sufficient.

☐ _____

7. The applicant shall pay attention to the following matters:

(1) It is stipulated in Articles 11 and 12 of the *Administrative Measures on Prioritized Examination of Patent Applications* that time limit for the applicant to make a response to the Office Action of the invention patent is within 2 months since the date of the issuance of the notification, if the applicant makes no response overdue, CNIPA may suspend the priority examination procedure and handle it according to the ordinary procedure. That is, in accordance with Article 37 of the Patent Law, the applicant shall file the Statements within four

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CHINA NATIONAL INTELLECTUAL PROPERTY ADMINISTRATION

(2) months from the date of receiving this Office Action. If the applicant does not respond before this deadline without a reasonable explanation, the application will be considered to have been withdrawn.

(2) Amendments made to the application by the applicant shall comply with Article 33 of the Patent Law and may not exceed the scope of the disclosure of the original description and list of claims. Amendments to the patent application documents shall also comply with Rule 51.3 of the Implementing Regulations of the Patent Law, and the amendments shall be prepared in accordance with the requirements in this Office Action.

(3) The applicant's Response and/or amendments shall be mailed or delivered to the Filing Office of CNIPA. Any documents not mailed or delivered to the Filing Office have no legal validity.

(4) Any applicant and/or agent shall not directly go to CNIPA to have an interview with the examiner without having an appointment.

8. The text of this Office Action contains 3 page(s), and has the following attachment(s):

☐ _____ copy (copies) of the cited reference(s), all together _____ page(s).

☐ _____

Examiner: CHEN Hengqiao

Contact No.: 028-62967712

Examination Department: Electricity Patent
Examination Department of Sichuan Patent
Examination Cooperation Center

210403
2019.4

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For electronic applications, related documents should be submitted by means of the electronic patent application system in the form of electronic documents. The application documents filed by paper or other forms are deemed not to have been submitted, unless otherwise specified.



The Third Office Action

Application No.: 2018106401579

The applicant filed its Statements and the amended application documents on November 13, 2020. After reading the aforesaid documents, the examiner proceeded to examine this case and put forward the following examination opinions again.

1. The technical solution set forth in claim 1 does not involve an inventive step as defined in Article 22.3 of the Patent Law.

Claim 1 sets forth a separator. Reference Document 1 (CN105449140A) is the closest prior art and discloses a separator and a lithium-ion secondary battery, and specifically discloses the following technical features (see paragraphs [0013]-[0026], [0147], and [0155]-[0157] of the specification): in the separator according to the first aspect of the present invention, the separator (equivalent to “a porous substrate”) may be selected from at least one of polyolefin, polyimide, polyurethane, and polyisocyanate; the surface of the separator may be coated with an inorganic particle coating and/or an organic particle coating (equivalent to “a porous layer, and the porous layer is disposed on a surface of the porous substrate and comprises inorganic particles”) such that the separator has a stronger heat resistance and puncture resistance.

The separator has an elongation at break of 900% in a transverse direction. Based on the way to measuring the elongation at break recited in Reference Document 1 and in combination with the correlated expression approaches of the present application, the elongation at break can be expressed as $(L_1 - L_0)/L_0$. The calculation equation of the absolute plastic deformation rate in the present application is: $(L_2 - L_0)/L_0$. Based on Reference Document 1 and the disclosure of the present application, those skilled in the art could directly and unambiguously determine $L_1 \geq L_2$. Therefore, $(L_1 - L_0)/L_0 \geq (L_2 - L_0)/L_0$. That is, the scope of $(L_2 - L_0)/L_0 \leq 900\%$ in Reference Document 1 partially overlaps the scope of 40%-1800%.

When the separator has higher elongations at break both in the transverse and longitudinal directions simultaneously, that is, there is a higher ratio of the elongation at break in the transverse direction (TD) of the separator to the mechanical strength of the separator in the transverse direction, and meanwhile there is a lower ratio of the mechanical strength of the separator in the longitudinal direction to the elongation at break of the separator in the longitudinal direction (MD). At this time, when the lithium-ion secondary battery is impacted by a nail or other needle-like foreign bodies, the excellent ductility of the separator in the longitudinal direction (MD) and in the transverse direction (TD) will prevent the nail or other needle-like foreign bodies from piercing the separator. Moreover, the separator may further wrap the tip of the nail to prevent it from contacting the cathode and anode, thereby facilitating the protection of the lithium-ion secondary battery.

Therefore, the technical solution set forth in claim 1 differs from the technical disclosure of Reference Document 1 in that the porous layer further comprises a binder; it thus can be determined that the technical problem to solved practically solved thereby is how to configure a porous layer.

However, fixing inorganic particles on a porous substrate with a binder is a conventional technical means in the art.

Hence, it would have been obvious for those skilled in the art to arrive at the technical solution

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set forth in claim 1 on the basis of Reference Document 1 in combination with common knowledge in the art. Therefore, the technical solution set forth in claim 1 neither possesses prominent substantive features nor represents a notable progress and thus, does not involve an inventive step as defined in Article 22.3 of the Patent Law.

2. The technical solutions set forth in claims 2-3 do not involve an inventive step as defined in Article 22.3 of the Patent Law

Claims 2-3 are all dependent of claim 1. However, Reference Document 1 has disclosed (see paragraphs [0013]-[017] of the specification): as can be seen from the comments on claim 1, the separator has $(L_2-L_0)/L_0 \leq 900\%$ in a transverse direction (equivalent to “an absolute plastic deformation rate in a first direction being not greater than 900%”, i.e., overlapping the present application) and has an elongation at break of 600% in a longitudinal direction. Based on the same calculation method, the separator has $(L_2-L_0)/L_0 \leq 600\%$ in a longitudinal direction (equivalent to “an absolute plastic deformation rate in a second direction being not greater than 600%”, partially overlapping the scope of the present application).

Therefore, insofar as claim 1 to which claims 2-3 refer is not inventive, the aforesaid dependent claims 2-3 likewise do not involve an inventive step as defined in Article 22.3 of the Patent Law.

3. The technical solutions set forth in claims 4-5 do not involve an inventive step as defined in Article 22.3 of the Patent Law.

Claims 4-5 are dependent of claims 1 and 4. Firstly, it would be well known to those skilled in the art that the relative plastic deformation rate is an index to measure the plastic deformation capacity of materials.

Secondly, Reference Document 1 has provided the technical means that when the battery is pierced by a nail or other needle-like foreign bodies, a porous substrate with good ductility is used to extend with the foreign body and wrap the foreign body by means of its good plastic deformation capacity, thus improving the safety of the battery. On this basis, to select a suitable porous substrate, those skilled in the art could readily conceive of evaluating the plastic deformation capacity of the porous substrate via such an index of relative plastic deformation rate and determining the suitable ranges of the relative plastic deformation rate in the first and/or second directions through limited number of tests.

Therefore, insofar as the claim to which claims 4-5 refer is not inventive, the aforesaid dependent claims 4-5 likewise do not involve an inventive step as defined in Article 22.3 of the Patent Law.

4. The technical solutions set forth in claims 6-10 do not involve an inventive step as defined in Article 22.3 of the Patent Law.

Claims 6-10 are all dependent of claim 1. However, Reference Document 1 has disclosed (see paragraphs [0020]-[0021] and [0025], and Table 1 of the specification): the separator may be selected from at least one of polyolefin, polyimide, polyurethane, and polyisocyanate; the polyolefin may be selected from at least one of polypropylene (PP) and polyethylene (PE);

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inorganic particles in the inorganic particle coating may be selected from at least one of aluminium oxide, silicon dioxide, titanium dioxide, cerium dioxide, calcium carbonate, calcium oxide, zinc oxide, magnesium oxide, cerium titanate, calcium titanate, barium titanate, lithium phosphate, lithium titanium phosphate, lithium aluminum titanium phosphate, lithium nitride, and lanthanum lithium titanate.

as can be seen from Example 1 of Table 1, the separator has a thickness of 16 μm (disclosing a small scope of the present application).

In addition, hafnium dioxide, tin oxide, nickel oxide, zirconia, yttria, silicon carbide, boehmite, aluminum hydroxide, magnesium hydroxide, calcium hydroxide, and barium sulfate are common inorganic particles with electrochemical stability in the art. Using one or more of the aforesaid materials for replacement or being in combination with one or more inorganic particles in Reference Document 1 as inorganic particles in the porous layer is a conventional selection to those skilled in the art.

Moreover, the vinylidene fluoride-hexafluoropropylene copolymer, a vinylidene fluoride-trichloroethylene copolymer, polymethyl methacrylate, polyacrylic acid, polyacrylate, polyacrylonitrile, polyvinyl pyrrolidone, polyvinyl acetate, ethylene-vinyl acetate copolymer, polyimide, polyethylene oxide, cellulose acetate, cellulose acetate butyrate, cellulose acetate propionate, cyanoethyl amylopectin, cyanoethyl polyvinyl alcohol, cyanoethyl cellulose, cyanoethyl sucrose, amylopectin, sodium carboxymethyl cellulose, lithium carboxymethyl cellulose, an acrylonitrile-styrene-butadiene copolymer, polyvinyl alcohol, polyvinyl ether, polytetrafluoroethylene, polyhexafluoropropylene, styrene-butadiene copolymer, and polyvinylidene fluoride are common binder materials for separator. Using one or more of the aforesaid materials as a binder of the porous layer to fix inorganic particles on the porous substrate is a conventional selection to those skilled in the art.

Designing the porous substrate to include a polymer film, a multilayer polymer film or a nonwoven fabric is a conventional configuration to those skilled in the art. Furthermore, polyethylene terephthalate, polybutylene terephthalate, polyphenylene terephthamide, polyester, polyacetal, polyamide, polycarbonate, polyetheretherketone, polyaryletherketone, polyetherimide, polyamideimide, polybenzimidazole, polyethersulfone, polyphenylene ether, cyclic olefin copolymer, polyphenylene sulfide, and polyethylene naphthalene are also all common separator materials in the art. Using one or more of the aforesaid materials to manufacture a polymer film, a multilayer polymer film or a nonwoven fabric is also a conventional selection to those skilled in the art.

It is also would be well known to those skilled in the art that on the one hand, the porosity of separator will affect the internal resistance of a battery, on the other hand, will affect the strength of the separator. Specifically, the lower the porosity is, the slower the ionic mobility is, thus showing an increased internal resistance. However, the separator is less vulnerable to be destroyed with the increase of its strength; the higher the porosity is, the faster the ionic mobility is, the smaller the internal resistance is, and the less stable the strength of the separator is. Therefore, those skilled in the art could determine a suitable porosity based on the practical demands for the separator (e.g., demands for strength and ion transmittance) through limited number of tests. Therefore, insofar as the claim to which claims 6-10 refer is not inventive, the aforesaid dependent claims 6-10 likewise do not involve an inventive step as defined in Article 22.3 of the Patent Law.

5. The technical solution set forth in claim 11 does not involve an inventive step as defined in

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Article 22.3 of the Patent Law.

Claim 11 sets forth an electrochemical device. Reference Document 1 (CN105449140A) is the closest prior art and discloses a separator and a lithium-ion secondary battery (equivalent to an “electrochemical device”), and specifically discloses the following technical features (see paragraph [0026] of the specification):

the lithium-ion secondary battery (equivalent to the “electrochemical device”) comprises a cathode, an anode, a separator spaced between the cathode and the anode, and an electrolyte solution.

In addition, based on the comments on the preceding claim, the separator of the claims 1-10 does not involve an inventive step.

Therefore, when the separator of claims 1-10 is selectively adopted in the electrochemical device of claim 11, claim 11 neither possesses prominent substantive features nor represents notable progress, and thus does not involve an inventive step as provided in Article 22.3 of the Patent Law.

12. The technical solution set forth in claim 12 does not involve an inventive step as defined in Article 22.3 of the Patent Law.

Claim 12 cites claim 11. However, Reference Document 1 has disclosed a lithium-ion secondary battery (equivalent to “the electrochemical device comprises lithium ion batteries”).

Therefore, insofar as the claim to which claim 12 refers is not inventive, the aforesaid dependent claim 12 likewise does not involve an inventive step as defined in Article 22.3 of the Patent Law.

On the basis of the above reasons, the present application may be not granted a patent right since no claim involves an inventive step. Moreover, the present application does not recite any substantive patentable content in the specification, so the present application yet does not have a prospect of being granted a patent right. If the applicant is unable to provide sufficient reasons for that the present application involves an inventive step within the response time limit specified in the present Office Action, the present application will be finally rejected.

Examiner: CHEN Hengqiao

Code: 629869

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Claims

1. A separator, comprising:

a porous substrate; and

a porous layer;

wherein the porous layer is disposed on a surface of the porous substrate and comprises inorganic particles and a binder; and the porous substrate has an absolute plastic deformation rate in a first direction ranging from about 40% to about 1800% and has a relative plastic deformation rate in the first direction ranging from about 50% to about 100%; wherein the absolute plastic deformation rate is calculated according to an equation $(L2-L0)/L0 \times 100\%$ and the relative plastic deformation rate relative plastic deformation rate $(L2-L0)/(L1-L0) \times 100\%$, where L0 refers to a length of the porous substrate before stretching, L1 refers to a maximal length of the porous substrate when the porous substrate is stretched to breakage, and L2 refers to a length of the porous substrate after the porous substrate is stretched to breakage and docked along the fracture caused by the breakage and flattened.

2. The separator according to claim 1, wherein the porous substrate has an absolute plastic deformation rate in a second direction ranging from about 60% to about 1800%.

3. The separator according to claim 1, wherein the porous substrate has at least one of the following properties:

an absolute plastic deformation rate in the first direction ranging from about 40% to about 1600%; and

an absolute plastic deformation rate in the second direction ranging from about 70% to about 1600%.

4. The separator according to claim 1, wherein the porous substrate has a relative plastic deformation rate in a second direction ranging from about 60% to about 100%.

5. The separator according to claim 1, wherein the porous substrate has a relative plastic deformation rate in a first direction ranging from about 65% to about 90%.

6. The separator according to claim 4, wherein the porous substrate has a relative plastic deformation rate in a second direction ranging from about 75% to about 90%.

7. The separator according to claim 1, wherein the binder comprises at least one selected from the group consisting of a vinylidene fluoride-hexafluoropropylene copolymer, a vinylidene fluoride-trichloroethylene copolymer, polymethyl methacrylate, polyacrylic acid, polyacrylate, polyacrylonitrile, polyvinyl pyrrolidone, polyvinyl acetate, an ethylene-vinyl acetate copolymer, polyimide, polyethylene oxide, cellulose acetate, cellulose acetate butyrate, cellulose acetate propionate, cyanoethyl amylopectin, cyanoethyl polyvinyl alcohol, cyanoethyl cellulose, cyanoethyl sucrose, amylopectin, sodium carboxymethyl cellulose, lithium carboxymethyl cellulose, an acrylonitrile-styrene-butadiene copolymer, polyvinyl alcohol, polyvinyl ether, polytetrafluoroethylene, polyhexafluoropropylene, a styrene-butadiene copolymer, and polyvinylidene fluoride.

8. The separator according to claim 1, wherein the inorganic particles comprise at least one selected from the group consisting of alumina, silica, magnesia, titanium oxide, hafnium dioxide, tin oxide, cerium dioxide, nickel oxide, zinc oxide, calcium oxide, zirconia, yttria, silicon carbide, boehmite, aluminum hydroxide, magnesium hydroxide, calcium hydroxide and

barium sulfate.

9. The separator according to claim 1, wherein the porous substrate comprises a polymer film, a multilayer polymer film or a nonwoven fabric, wherein the polymer film, the multilayer polymer film or the nonwoven fabric is formed by any one or more of the following polymers: polyethylene, polypropylene, polyethylene terephthalate, polybutylene terephthalate, polyphenylene terephthamide, polyester, polyacetal, polyamide, polycarbonate, polyimide, polyetheretherketone, polyaryletherketone, polyetherimide, polyamideimide, polybenzimidazole, polyethersulfone, polyphenylene ether, a cyclic olefin copolymer, polyphenylene sulfide or polyethylene naphthalene.

10. The separator according to claim 1, wherein the porous substrate has a thickness ranging from about 1 to about 40 μm .

11. The separator according to claim 1, wherein the porous substrate has a porosity ranging from about 10% to about 70%.

12. An electrochemical device, comprising:

a cathode;

an anode; and

the separator according to claims 1-11.

13. The electrochemical device according to claim 12, wherein the electrochemical device comprises lithium ion batteries.

Applicant's Statements

Please fill in the columns of this table according to the “notes”

① Patent Application or Patent	Application No. or Patent No.: 2018106401579	
	Title of Invention-Creation: SEPARATOR AND ELECTROCHEMICAL DEVICE	
	Applicant or Patentee (*Fill in the first signatory applicant) NINGDE AMPEREX TECHNOLOGY LTD	
② Matters: Please use the Statements (concerning fees) regarding the statement of fees Select one of the following options only: ☒ State the opinions in regard to the Third Office Action (Issuing No.: 2020120400777040) issued by the China National Intellectual Property Administration on December 09, 2020. ☐ Supplement the opinions in regard to _____ Office Action (Issuing No.: _____) issued by the China National Intellectual Property Administration on MM DD, YY. ☐ Propose amendments voluntarily (in accordance with Rules 51.1 and 51.2 of the Implementing Regulations of the Patent Law). ☐ Others.		
③ Opinions stated: Please see the appendix!		
④ List of the appendix [Appendix name] Appendix of the Applicant's Statements, amendment sheet of the claims, and replacement sheet of the claims [Appendix attribute] Electronic file Filed credentials number: _____.		
⑤ Signed or stamped by the parties involved or patent agency Lee and Li-Leaven IPR Agency Ltd. December 29, 2020	⑥ Comments of CNIPA MY DD YY	



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Applicant's Statements

Claims

1. A separator, comprising:

a porous substrate; and

a porous layer;

wherein the porous layer is disposed on a surface of the porous substrate and comprises inorganic particles and a binder; and the porous substrate has an absolute plastic deformation rate in a first direction ranging from about 40% to about 1800% and has a relative plastic deformation rate in the first direction ranging from about 50% to about 100%; wherein the absolute plastic deformation rate is calculated according to an equation $(L2-L0)/L0 \times 100\%$ and the relative plastic deformation rate is calculated according to an equation $(L2-L0)/(L1-L0) \times 100\%$, where L0 refers to a length of the porous substrate before stretching, L1 refers to a maximal length of the porous substrate when the porous substrate is stretched to breakage, and L2 refers to a length of the porous substrate after the porous substrate is stretched to breakage and docked along the fracture caused by the breakage and flattened.

2. The separator according to claim 1, wherein the porous substrate has an absolute plastic deformation rate in a second direction ranging from about 60% to about 1800%.

3. The separator according to claim 1, wherein the porous substrate has at least one of the following properties:

an absolute plastic deformation rate in the first direction ranging from about 40% to about 1600%; and

an absolute plastic deformation rate in the second direction ranging from about 70% to about 1600%.

4. The separator according to claim 1, wherein the porous substrate ~~has at least one of the following properties:~~

~~a relative plastic deformation rate in the first direction ranging from about 50% to about 100%; and~~

~~a relative plastic deformation rate in the second direction ranging from about 60% to about 100%;~~

5. The separator according to claim ~~4~~1, wherein the porous substrate ~~has at least one of the following properties:~~

~~a relative plastic deformation rate in the first direction ranging from about 65% to about 90%; and~~

6. The separator according to claim 4, wherein the porous substrate has a relative plastic deformation rate in a second direction ranging from about 75% to about 90%.

~~6~~7. The separator according to claim 1, wherein the binder comprises at least one selected from the group consisting of a vinylidene fluoride-hexafluoropropylene copolymer, a vinylidene fluoride-trichloroethylene copolymer, polymethyl methacrylate, polyacrylic acid, polyacrylate, polyacrylonitrile, polyvinyl pyrrolidone, polyvinyl acetate, an ethylene-vinyl acetate copolymer, polyimide, polyethylene oxide, cellulose acetate, cellulose acetate butyrate, cellulose acetate propionate, cyanoethyl amylopectin, cyanoethyl polyvinyl alcohol, cyanoethyl cellulose,

cyanoethyl sucrose, amylopectin, sodium carboxymethyl cellulose, lithium carboxymethyl cellulose, an acrylonitrile-styrene-butadiene copolymer, polyvinyl alcohol, polyvinyl ether, polytetrafluoroethylene, polyhexafluoropropylene, a styrene-butadiene copolymer, and polyvinylidene fluoride.

~~7~~8. The separator according to claim 1, wherein the inorganic particles comprise at least one selected from the group consisting of alumina, silica, magnesia, titanium oxide, hafnium dioxide, tin oxide, cerium dioxide, nickel oxide, zinc oxide, calcium oxide, zirconia, yttria, silicon carbide, boehmite, aluminum hydroxide, magnesium hydroxide, calcium hydroxide and barium sulfate.

~~8~~9. The separator according to claim 1, wherein the porous substrate comprises a polymer film, a multilayer polymer film or a nonwoven fabric, wherein the polymer film, the multilayer polymer film or the nonwoven fabric is formed by any one or more of the following polymers: polyethylene, polypropylene, polyethylene terephthalate, polybutylene terephthalate, polyphenylene terephthamide, polyester, polyacetal, polyamide, polycarbonate, polyimide, polyetheretherketone, polyaryletherketone, polyetherimide, polyamideimide, polybenzimidazole, polyethersulfone, polyphenylene ether, a cyclic olefin copolymer, polyphenylene sulfide or polyethylene naphthalene.

~~9~~10. The separator according to claim 1, wherein the porous substrate has a thickness ranging from about 1 to about 40 μm .

~~10~~11. The separator according to claim 1, wherein the porous substrate has a porosity ranging from about 10% to about 70%.

~~11~~12. An electrochemical device, comprising:

a cathode;

an anode; and

the separator according to claims 1-~~10~~11.

~~12~~13. The electrochemical device according to claim ~~11~~12, wherein the electrochemical device comprises lithium ion batteries.



Your Respected Examiner,

Many thanks for your careful and meticulous examination to the present application! After studying and reading the examination comments intensively, the applicant amended the claims and stated the following opinions:

I. Claim Amendments

1. The applicant incorporates the relative plastic deformation rate of the porous substrate in a first direction recited in the original claim 4 into claim 1 and defines the calculation equation of the relative plastic deformation rate.

2. Sequence number and citing relationships of the claims are amended correspondingly.

Basis for the amendment is referring to paragraphs [0025]-[0030] of the specification in the publication CN108807821A of the present application (corresponding to lines 14-67 on column 4 and lines 1-17 on column 5 of the specification in its US counterpart US10964927). The above amendment does not cite new content and thus, complies with the provision of Article 33 of the Patent Law.

II. Applicant's Statements

The amended claim 1 of the present application recites “the porous substrate has a relative plastic deformation rate in a first direction ranging from about 50% to 100%”.

The specification of the present application discloses the following test method for the “relative plastic deformation rate” (please see paragraphs [0075]-[0078] of the specification in the disclosure CN108807821A of the present application, corresponding to lines 14-67 on column 4 and lines 1-17 on column 5 of the specification in its US counterpart US10964927):

“(1) Test Method for the Plastic Deformation Rate of the Porous Substrate

The porous substrate was cut into strips having a size of 100 mm x 20 mm along the first direction and the second direction. A region having a length of L0=40mm was arbitrarily selected in the range of 100 mm in the length direction of the strip, and marklines were made at two ends of the region. An area between the marklines was stretched to break by a high-speed universal tensile testing machine at a speed of 50mm/min. The maximum length L1 reached by the stretching was recorded, and then the broken porous substrate was docked along the fracture and flattened to test the length L2 in a natural state. The absolute plastic deformation rate $\epsilon 1$ and the relative plastic deformation rate $\epsilon 2$ of the porous substrate in a certain direction were calculated by the following formula:

$$\epsilon 1=(L2-L0)/L0\times 100\%$$

$$\epsilon 2=(L2-L0)/(L1-L0)\times 100\%”$$

The test method is shown in FIG. 1:

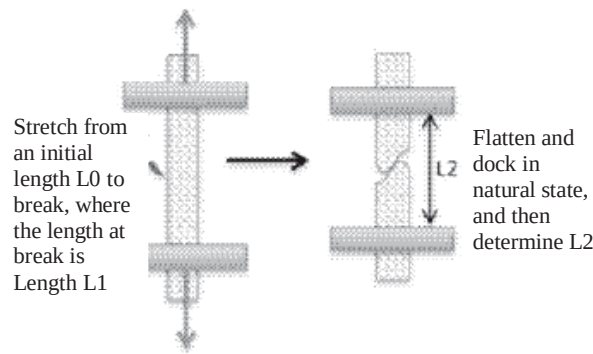


FIG. 1

The present application further discloses the following content (please see paragraph [0026] of the specification in the publication of the present application, corresponding to lines 22-40 on column 4 of the specification in its US counterpart US10964927):

“The porous substrate is subjected to both elastic deformation and plastic deformation during the tensile test. The amount of elastic deformation= L_1-L_2 , the amount of plastic deformation= L_2-L_0 , and the total amount of deformation=the amount of elastic deformation + the amount of plastic deformation. Plastic deformation is a permanent deformation that does not bounce back.”

The relative plastic deformation rate recited in the amended claim 1 of the present application reflects the percentage of the plastic deformation of the porous substrate in the total deformation. With the increase of the relative plastic deformation rate, more plastic deformation (i.e., permanent deformation) of the porous substrate occurs during the stretching process and the porous substrate is less prone to bounce back.

Reference Document 1 (CN105449140A) does not disclose, teach or suggest the relative plastic deformation rate of the porous substrate set forth in the present application.

In addition, as stated in response to the First Office Action, the separator in Reference Document 1 can rapidly extend and stretch out under impact, nail penetration, side extrusion, and other abuses and thus can prevent the direct contact between the cathode and the anode caused by the brittle tear of the separator (please see paragraph [0009] of the specification in Reference Document 1). That is, the separator in Reference Document 1 has a puncture resistance and thus, is harder to be torn. However, *Reference Document 1 does not consider the conditions of the separator after being torn under impact, nail penetration, side extrusion, and other abuses*. Specifically, there are two stages of the separator in the process of nail penetration, the first stage is the process that the separator extends along with the nail, and the nail is wrapped by the separator to prevent short circuit caused by the contact between the cathode and the anode. The second stage is the process that the separator in the puncture position bounces back under the action of force after the separator is completely pierced by the nail; with the increase of the resilience, there are more exposed portions of the nail, and the cathode and the anode will contact with each other to cause short circuit via the exposed nail. Obviously, Reference Document 1 merely considers the first stage, but does not consider the bouncing back of the separator in the second stage. That is, no matter how the separator extends along with the nail in the first stage, most of the separator will bounce back after the separator is completely pierced by the nail if the relative plastic deformation rate is too small (similar to the circumstance that a rubber band is broken under the action of tensile force), which will also cause short circuit due to the contact between the cathode and the anode.



In the present application, the porous substrate has a higher relative plastic deformation rate. As stated in the specification of the present application, the porous substrate has a large plastic deformation under external force, so that when the separator is pieced by a nail, the separator will have a large extensional deformation with the nail and bounces back less (similar to the circumstance that plasticine is broken under the action of tensile force), thereby maintaining the effect in isolating the cathodes and anodes, preventing the internal short circuit in the lithium ion battery, and improving the safety of the lithium ion battery (please see paragraph [0027] of the specification in Reference Document 1, corresponding to lines 41-47 on column 4 of the specification in its US counterpart US10964927). That is, the nail can be still wrapped by the separator of the present application after being pierced by the nail, thus preventing short circuit.

The amended claim 1 of the present application is not obvious over Reference Document 1 at least based on the above reasons and thus, involves an inventive step. Similarly, the amended claims 2-13 also involve an inventive step over Reference Document 1.

Could you take the aforesaid opinions into full consideration and continue to examine the amended text of the present application? If you think there are any problems in the present application, could you give us another opportunity to amend or state opinions? Welcome to contact the agent at any time (010-85187141-850). Thanks a lot!



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South Avenue, Dongcheng District Lee and Li-Leaven IPR
Agency Ltd.
XIAO Fukuan (10-85187141-17)

Issuing Date:

February 19, 2021



Application No. or Patent No.: **201810640157.9**

Issuing No: **2021010701936060**

Applicant or Patentee: Ningde Amperex Technology Ltd

Title of Invention: Separator And Electrochemical Device

Notification to Grant Patent Right for Invention

1. In accordance with the provisions of Article 39 of the Patent Law and Rule 54 of the Implementing Regulations of the Patent Law, after substantive examination, no ground for rejection is found to the above-captioned invention patent application, and now a notification to grant a patent right for invention is made.

After receiving the present notification, the applicant shall further go through the formalities of registration in accordance with the Notification to Go through Formalities of Registration.

After the applicant goes through the formalities of registration on schedule, CNIPA will make a decision of granting patent right to award a patent for invention, and give registration and announcement.

Where the formalities of registration are not handled overdue, it shall be deemed to waive the right to grant a patent right.

It is stipulated by the laws and administrative rules and regulations that if formalities of approval, registration, etc. need to be handled for the implementation of corresponding technologies, please go through the formalities in accordance with the provisions.

2. The above-captioned invention patent application granted a patent right is based on the following application documents:

☐ The application text as originally filed. ☐ The text filed on the filing date of the divisional application. ☒ The following application text(s):

The drawing of the abstract, abstract of the description, paragraphs 1-190 of the description, and accompanying drawings of the description filed on the filing date; and claims 1-13 filed on December 29, 2020.

3. Title of the above-captioned invention patent application granted a patent right is:

☒ not altered.

☐ altered from ____.

4. ☐ The applicant submitted a "statement of abandonment of patent right" with the patent number ____ on MM DD, YY. Upon examination,

☐ Enter the procedure of abandonment of patent right.

☐ Do not enter the procedure of abandonment of patent right on the following ground: the applicant stated that the abandoned patent and the present invention patent application are not a same invention-creation.

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CHINA NATIONAL INTELLECTUAL PROPERTY ADMINISTRATION

5. ☐ The examiner makes the following amendments to the application documents in accordance with the functional authority:

Notes: the application text voluntarily amended by the applicant and received after issuing the notification shall be not taken into account.



Examiner: CHEN Hengqiao

Examination Department: Electricity Patent
Examination Department of Sichuan Patent
Examination Cooperation Center

Contact number: 028-62967712

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证 明

本证明之附件与国家知识产权局专利申请文档中的存档文件一致。

申请号/专利号: 2018106401579

文件名称: 第一次审查意见通知书-20200730(共 5 页)、意见陈述书-20200826(共 2 页)、其他证明文件-20200826(共 3 页)、第 N 次审查意见通知书-20201012(共 3 页)、权利要求书-20201113(共 2 页)、意见陈述书-20201113(共 2 页)、修改对照页-20201113(共 2 页)、其他证明文件-20201113(共 1 页)、第 N 次审查意见通知书-20201209(共 5 页)、权利要求书-20201229(共 2 页)、意见陈述书-20201229(共 2 页)、修改对照页-20201229(共 2 页)、其他证明文件-20201229(共 3 页)、授予发明专利权通知书-20210219(共 1 页)



国家知识产权局

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萧辅宽(10-85187141-17)

发文日:

2020年07月30日



申请号或专利号: 201810640157.9

发文序号: 2020072700711410

申请人或专利权人: 宁德新能源科技有限公司

发明创造名称: 隔离膜和电化学装置

第一次审查意见通知书

1. ☒ 应申请人提出的实质审查请求, 根据专利法第35条第1款的规定, 国家知识产权局对上述发明专利申请进行实质审查。

☐ 根据专利法第35条第2款的规定, 国家知识产权局决定自行对上述发明专利申请进行审查。

2. ☐ 申请人要求以其在:

☐ 申请人已经提交了经原受理机构证明的第一次提出的在先申请文件的副本。

☐ 申请人尚未提交经原受理机构证明的第一次提出的在先申请文件的副本, 根据专利法第30条的规定视为未要求优先权要求。

3. ☐ 经审查, 申请人于____提交的修改文件, 不符合专利法实施细则第51条第1款的规定, 不予接受。

4. 审查针对的申请文件:

☒ 原始申请文件。 ☐ 分案申请递交日提交的文件。 ☐ 下列申请文件:

5. ☐ 本通知书是在未进行检索的情况下作出的。

☒ 本通知书是在进行了检索的情况下作出的。

☒ 本通知书引用下列对比文件(其编号在今后的审查过程中继续沿用):

编号	文件号或名称	公开日期 (或抵触申请的申请日)
1	CN 105449140A	20160330

6. 审查的结论性意见:

关于说明书:

☐ 申请的内容属于专利法第5条规定的不授予专利权的范围。

☐ 说明书不符合专利法第26条第3款的规定。

☐ 说明书不符合专利法第33条的规定。

☐ 说明书的撰写不符合专利法实施细则第17条的规定。

☐ _____

210401
2018.10

纸件申请, 回函请寄: 100088 北京市海淀区蓟门桥西土城路6号 国家知识产权局专利局受理处收
电子申请, 应当通过电子专利申请系统以电子文件形式提交相关文件。除另有规定外, 以纸件等其他形式提交的文件视为未提交。



国家知识产权局

申请号: 2018106
本申请涉及一种

关于权利要求书:

- ☐ 权利要求_____不符合专利法第 2 条第 2 款的规定。
- ☐ 权利要求_____不符合专利法第 9 条第 1 款的规定。
- ☐ 权利要求_____不具备专利法第 22 条第 2 款规定的新颖性。
- ☒ 权利要求 1-12 不具备专利法第 22 条第 3 款规定的创造性。
- ☐ 权利要求_____不具备专利法第 22 条第 4 款规定的实用性。
- ☐ 权利要求_____属于专利法第 25 条规定的不授予专利权的范围。
- ☐ 权利要求_____不符合专利法第 26 条第 4 款的规定。
- ☐ 权利要求_____不符合专利法第 31 条第 1 款的规定。
- ☐ 权利要求_____不符合专利法第 33 条的规定。
- ☐ 权利要求_____不符合专利法实施细则第 19 条的规定。
- ☐ 权利要求_____不符合专利法实施细则第 20 条的规定。
- ☐ 权利要求_____不符合专利法实施细则第 21 条的规定。
- ☐ 权利要求_____不符合专利法实施细则第 22 条的规定。
- ☐ _____

- ☐ 申请不符合专利法第 26 条第 5 款或者实施细则第 26 条的规定。
- ☐ 申请不符合专利法第 20 条第 1 款的规定。
- ☐ 分案申请不符合专利法实施细则第 43 条第 1 款的规定。

上述结论性意见的具体分析见本通知书的正文部分。

7. 基于上述结论性意见, 审查员认为:

- ☐ 申请人应当按照通知书正文部分提出的要求, 对申请文件进行修改。
- ☐ 申请人应当在意见陈述书中论述其专利申请可以被授予专利权的理由, 并对通知书正文部分中指出的不符合规定之处进行修改, 否则将不能授予专利权。
- ☒ 专利申请中没有可以被授予专利权的实质性内容, 如果申请人没有陈述理由或者陈述理由不充分, 其申请将被驳回。
- ☐ _____

8. 申请人应注意下列事项:

(1) 根据《专利优先审查管理办法》第 11 条、第 12 条的规定: 申请人答复发明专利审查意见通知书的期限为通知书发文日起 2 个月, 如果申请人逾期不答复, 国家知识产权局可以停止优先审查程序, 按普通程序处理, 即根据专利法第 37 条的规定, 申请人应当在收到本通知书之日起的 4 个月内陈述意见, 如果申请人无正当理由逾期不答复, 其申请将被视为撤回。

(2) 申请人对其申请的修改应当符合专利法第 33 条的规定, 不得超出原说明书和权利要求书记载的范围, 同时申请人对专利申请文件进行的修改应当符合专利法实施细则第 51 条第 3 款的规定, 按照本通知书的要求进行修改。

(3) 申请人的意见陈述书和/或修改文本应邮寄或递交国家知识产权局专利局受理处, 凡未邮寄或递交给受理处的文件不具备法律效力。

(4) 未经预约, 申请人和/或代理人不得前来国家知识产权局专利局与审查员举行会晤。

(5) 对进入实质审查阶段的发明专利申请, 在第一次审查意见通知书答复期限届满前(已提交答复意见的除外), 主动申请撤回的, 可以请求退还 50% 的专利申请实质审查费。

9. 本通知书正文部分共有 3 页, 并附有下列附件:

- ☐ 引用的对比文件的复印件共_____份_____页。
- ☐ _____

审查员: 陈恒桥

联系电话: 028-62967712

审查部门: 专利审查协作四川中心电学发明审查部

210401
2018. 10

纸件申请, 回函请寄: 100088 北京市海淀区蓟门桥西土城路 6 号 国家知识产权局专利局受理处收
电子申请, 应当通过电子专利申请系统以电子文件形式提交相关文件。除另有规定外, 以纸件等其他形式提交的文件视为未提交。

国家知识产权局

第一次审查意见通知书

申请号:2018106401579

本申请涉及一种隔离膜和电化学装置。经审查,现提出如下的审查意见:

1. 权利要求1所要求保护的技术方案不具备专利法第二十二条第三款规定的创造性

权利要求1请求保护一种隔离膜。对比文件1(CN105449140A)为最接近的现有技术,其公开了一种隔离膜及锂离子二次电池,并具体公开了以下技术特征(参见说明书第[0013]-[0026]、[0147]、[0155]-[0157]段):根据本发明第一方面所述的隔离膜中,所述隔离膜(相当于多孔基材)可选自聚烯烃、聚酰亚胺、聚氨酯、聚异氰酸酯中的至少一种;隔离膜的表面可涂布有无机颗粒涂层和/或有机颗粒涂层(相当于多孔层,且多孔层设置在多孔基材的表面,多孔层包括无机颗粒),以使隔离膜具有更强的耐热性和抗穿刺性;隔离膜横向方向的断裂延伸率为150%~900%(相当于第一方向的绝对塑性变形率为150%-900%,公开了本申请的小范围);隔离膜纵向方向的断裂延伸率为55~600%;

当隔离膜横向方向及纵向方向同时具有高的断裂延伸率时,即隔离膜横向方向(TD)的断裂延伸率与隔离膜纵向方向的机械强度的比值较高,同时隔离膜纵向方向的机械强度与隔离膜纵向方向(MD)的断裂延伸率的比值较低,此时,当锂离子二次电池受到钉子等针状异物冲击时,隔离膜纵向方向(MD)和横向方向(TD)优异的延展性会阻止钉子等针状异物刺破隔离膜,并且隔离膜还可包裹住钉子的尖部,防止其接触正负极片,进而有利于保护锂离子二次电池。

该权利要求所要求保护的技术方案与该对比文件所公开的技术内容相比,其区别技术特征在于:多孔层还包括粘结剂,由此确定其实际解决的技术问题为:如何设置多孔层。

然而,使用粘结剂来将无机颗粒固定在多孔基材上是本领域的常规技术手段。

因此,在对比文件1的基础上结合上述公知常识以获得该权利要求所要求保护的技术方案,对所属技术领域的技术人员来说是显而易见的,因此该权利要求所要求保护的技术方案不具备突出的实质性特点和显著的进步,因而不具备专利法第二十二条第三款规定的创造性。

2. 权利要求2-3所要求保护的技术方案不具备专利法第二十二条第三款规定的创造性

权利要求2-3均是权利要求1的从属权利要求。然而,对比文件1还公开了(参见说明书第[0013]-[0017]段):隔离膜横向方向的断裂延伸率为150%~900%(相当于第一方向的绝对塑性变形率为150%-900%,公开了本申请的小范围);隔离膜纵向方向的断裂延伸率为55~600%(相当于第二方向的绝对塑性变形率为55%-600%,与本申请的范围部分重叠)。

在其引用的权利要求不具备创造性的情况下,上述从属权利要求也不具备专利法第二十二条第三款规定的创造性。

3. 权利要求4-5所要求保护的技术方案不具备专利法第二十二条第三款规定的创造性

权利要求4、5分别是权利要求1、4的从属权利要求。首先,本领域技术人员知悉,相对塑性变形率是衡量材料塑性变形能力的一个指标。

其次,对比文件1已经给出了通过使用具有良好延展性的多孔基材,借助其良好的塑性变形能力在钉子



等针状异物刺入电池时能够随异物延展并将其包裹起来, 进而提高电池安全性这一技术手段。在此基础上, 本领域技术人员为了选用适宜的多孔基材, 容易想到可以使用相对塑性变形率这一指标对多孔基材的塑性能力进行评估并通过有限的试验确定适宜的第一方向和/或第二方向的相对塑性变形率范围。

在其引用的权利要求不具备创造性的情况下, 上述从属权利要求也不具备专利法第二十二条第三款规定的创造性。

4. 权利要求 6-10 所要求保护的技术方案不具备专利法第二十二条第三款规定的创造性

权利要求 6-10 均是权利要求 1 的从属权利要求。然而, 对比文件 1 已经公开了(参见说明书第 [0020]-[0021]、[0025]段, 表 1): 隔离膜可选自聚烯烃、聚酰亚胺、聚氨酯、聚异氰酸酯中的至少一种, 聚烯烃可选自聚丙烯(PP)、聚乙烯(PE)中的至少一种;

无机颗粒涂层中的无机颗粒可选自氧化铝、二氧化硅、二氧化钛、二氧化锶、碳酸钙、氧化钙、氧化锌、氧化镁、钛酸锶、钛酸钙、钛酸钡、磷酸锂、磷酸钛锂、磷酸钛铝锂、氮化锂、钛酸铜锂中的至少一种;

由表 1 实施例 1 可见, 隔膜厚度为 16 微米(公开了本申请的小范围)。

此外, 二氧化铅、氧化锡、氧化镍、氧化锆、氧化钇、碳化硅、勃姆石、氢氧化铝、氢氧化镁、氢氧化钙、硫酸钡均是本领域常见具有电化学稳定性的无机颗粒, 使用上述材料中的一种或多种来替换或者与对比文件 1 中一种或多种无机颗粒组合作为多孔层中的无机颗粒是本领域技术人员的常规选择。

而偏二氟乙烯-六氟丙烯的共聚物、偏二氟乙烯-三氯乙烯的共聚物、聚甲基丙烯酸甲酯、聚丙烯酸、聚丙烯酸盐、聚丙烯腈、聚乙烯基吡咯烷酮、聚乙酸乙烯酯、乙烯-乙酸乙烯酯的共聚物、聚酰亚胺、聚氧化乙烯、醋酸纤维素、乙酸丁酸纤维素、乙酸丙酸纤维素、氰基乙基支链淀粉、氰基乙基聚乙烯醇、氰基乙基纤维素、氰基乙基蔗糖、支链淀粉、羧甲基纤维素钠、羧甲基纤维素锂、丙烯腈-苯乙烯-丁二烯的共聚物、聚乙烯醇、聚乙烯醚、聚四氟乙烯、聚六氟丙烯、苯乙烯-丁二烯的共聚物、聚偏二氟乙烯也是本领域常见的隔膜用粘合剂材料, 使用上述材料中的一种或多种作为多孔层的粘合剂以将无机颗粒固定在多孔基材上是本领域技术人员的常规选择。

将多孔基材设计为包括聚合物膜、多层聚合物膜或无纺布膜是本领域技术人员的常规设置; 进一步的, 聚对苯二甲酸乙二醇酯、聚对苯二甲酸丁二醇酯、聚苯二甲酰苯二胺、聚酯、聚缩醛、聚酰胺、聚碳酸酯、聚醚醚酮、聚芳醚酮、聚醚酰亚胺、聚酰胺酰亚胺、聚苯并咪唑、聚醚砜、聚苯醚、环烯烃共聚物、聚苯硫醚、聚乙烯萘也都是本领域常见的隔膜材料, 使用上述材料中的一种或多种来制造聚合物膜、多层聚合物膜或无纺布膜也是本领域技术人员的常规选择。

本领域技术人员还知悉, 隔膜的孔隙率一方面会影响电池的内阻, 另一方面也会影响隔膜的强度。具体来说, 孔隙率越低, 离子迁移速率越慢, 进而表现为内阻增大, 但隔膜的强度越大, 越不容易被破坏; 孔隙率越高, 离子迁移速率越快, 内阻越小, 但隔膜的强度也越不稳定。因此, 本领域技术人员可以基于对隔膜实际的需求(例如强度以及离子透过率的需求)通过有限的试验来确定适宜的孔隙率。

在其引用的权利要求不具备创造性的情况下, 上述从属权利要求也不具备专利法第二十二条第三款规定的创造性。

5. 权利要求 11 所要求保护的技术方案不具备专利法第二十二条第三款规定的创造性

国家知识产权局

权利要求 11 请求保护一种电化学装置。对比文件 1 (CN105449140A) 为最接近的现有技术, 其公开了一种隔离膜及锂离子二次电池(相当于电化学装置), 并具体公开了以下技术特征 (参见说明书第[0026]段):

锂离子二次电池(相当于电化学装置), 包括: 正极片; 负极片; 隔离膜, 间隔于正极片和负极片之间; 以及电解液。

此外, 基于在先权利要求的评述意见可知, 权利要求 1-10 所述的隔离膜不具有创造性。

因此, 当权利要求 11 所述的电化学装置选择性的采用权利要求 1-10 所述的隔离膜时, 其不具有突出的实质性特点与显著的进步, 因而不具有专利法第二十二条第三款规定的创造性。

12. 权利要求 12 所要求保护的技术方案不具备专利法第二十二条第三款规定的创造性

权利要求 12 引用了权利要求 11。然而, 对比文件 1 已经公开了一种锂离子二次电池(相当于电化学装置包括锂离子电池)。

在其引用的权利要求不具备创造性的情况下, 上述从属权利要求也不具备专利法第二十二条第三款规定的创造性。

基于上述理由, 本申请因为所有权利要求均不具有创造性而不能被授予专利权, 说明书中也没有可以被授予专利权的实质性内容, 因而本申请不具备被授予专利权的前景。如果申请人不能在本通知书规定的答复期限内提出表明本申请具有创造性的充分理由, 本申请将被驳回。

审查员姓名: 陈恒桥

审查员代码: 629869

210401
2018.10

纸件申请, 回函请寄: 100088 北京市海淀区蓟门桥西土城路 6 号 国家知识产权局专利局受理处收
电子申请, 应当通过电子专利申请系统以电子文件形式提交相关文件。除另有规定外, 以纸件等其他形式提交的文件视为未提交。

请按照“注意事项”正确填写本表各栏

① 专 利 或 申 请 利	申请号或专利号 2018106401579
	发明创造名称 隔离膜和电化学装置
	申请人或专利权人 (*应当填写第一署名申请人) 宁德新能源科技有限公司
② 陈述事项：关于费用的意见陈述请使用意见陈述书（关于费用） 以下选项只能选择一项 ☒ 针对国家知识产权局于 2020 年 07 月 30 日发出的第一次审查意见通知书（发文序号 2020072700711410）陈述意见。 ☐ 针对国家知识产权局于 年 月 日发出的 通知书（发文序号 ）补充陈述意见。 ☐ 主动提出修改（根据专利法实施细则第 51 条第 1 款、第 2 款的规定）。 ☐ 其他事宜。	
③ 陈述的意见： 请见附页！	
④ 附件清单 【附件名称】 意见陈述书附页 【附件属性】 电子件 已备案的证明文件备案编号：_____。	
⑤ 当事人或专利代理机构签字或者盖章 北京律盟知识产权代理有限责任公司 2020 年 08 月 26 日	⑥ 国家知识产权局处理意见 年 月 日

20200826

意见陈述书



尊敬的审查员，
非常感谢您
见如下：

尊敬的审查员，您好！

非常感谢您对本申请认真细致的审查工作！经过仔细研读审查意见，申请人陈述意见如下：

本申请权利要求 1 记载了“所述多孔基材在第一方向的绝对塑性变形率为 40%~1800%”。本申请权利要求 1 中记载的绝对塑性变形率是多孔基材的，而不是在多孔基材上设置了层（例如，多孔层）形成的隔离膜整体的绝对塑性变形率。由于在多孔基材上设置的层会使得多孔基材的绝对塑性变形率发生变化，因此，多孔基材的绝对塑性变形率和隔离膜整体的绝对塑性变形率是不同的。

此外，本申请说明书公开了“绝对塑性变形率”的测试方法如下（请参见本申请公开文本 CN108807821A 说明书第[0075]-[0078]段）：

“（1）多孔基材的塑性变形率测试方法

将多孔基材分别沿第一方向和第二方向裁成尺寸为 100 mm×20 mm 的长条，在长条的长度方向的 100 mm 范围内任意选取长度为 $L_0=40$ mm 的一段区域，并在该区域的两端做标记线，采用高铁拉力机以 50 mm/min 的速度拉伸该标记线间的区域，拉伸至断裂，记录拉伸达到的最大长度 L_1 ，然后将断开的多孔基材沿断口对接并展平，测试其自然状态下的长度 L_2 ，通过下式计算多孔基材在某一方向上的绝对塑性变形率 ε_1 和相对塑性变形率 ε_2 ：

$$\varepsilon_1 = (L_2 - L_0) / L_0 \times 100\%$$

$$\varepsilon_2 = (L_2 - L_0) / (L_1 - L_0) \times 100\%$$

该测试方法如图 1 所示：

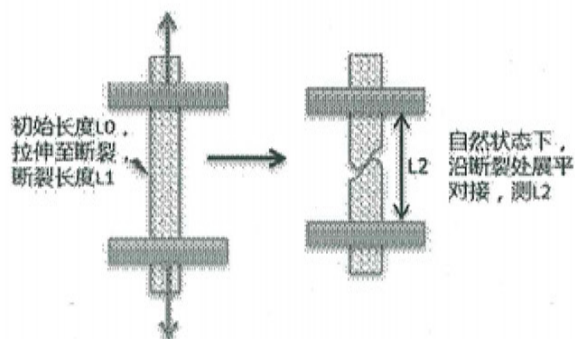


图 1。

本申请还公开了以下内容（请参见本申请公开文本说明书第[0026]段）：

“多孔基材在拉伸测试过程中，既会产生弹性变形，也会产生塑性变形。弹性变形量= $L1-L2$ ，塑性变形量= $L2-L0$ ，总的变形量=弹性变形量+塑性变形量。塑性变形是一种永久性的变形，不会发生回弹。”

可见，多孔基材在拉伸至断裂后有可能会发生回弹等弹性形变。本申请中的绝对塑性变形率反映了多孔基材的永久性变形情况，其已排除了弹性形变部分。

然而，对比文件 1 公开了隔离膜的断裂延伸率的测试方法如下：

[0146] (1) 隔离膜的断裂延伸率及机械强度测试

[0147] 对比例 1-2 和实施例 1-17 的隔离膜进行拉力测试，每组各取 20 条隔离膜，其中 10 条测试隔离膜横向方向 (TD) 的断裂延伸率及机械强度，另外 10 条测试隔离膜纵向方向 (MD) 的断裂延伸率及机械强度。测试过程如下：先将隔离膜沿横向方向 (TD) 裁成宽为 14.5mm、长为 50mm 的样品，采用高铁拉力机以 50mm/min 的恒定速率拉伸隔离膜，记录隔离膜横向方向 (TD) 断裂时的拉伸长度以及机械强度，即可得到隔离膜横向方向 (TD) 的断裂延伸率及机械强度；之后将隔离膜沿纵向方向 (MD) 裁成宽为 14.5mm、长为 50mm 的样品，采用高铁拉力机以 50mm/min 的恒定速率拉伸隔离膜，记录隔离膜纵向方向 (MD) 断裂时的拉伸长度以及机械强度，即可得到隔离膜纵向方向 (MD) 的断裂延伸率及机械强度。

根据上述方法，对比文件 1 仅测量了隔离膜被拉伸至断裂时的拉伸长度（相当于本申请中的 $L1$ ），而没有测量断开的隔离膜沿断口对接并展平后自然状态下的长度（即本申请中的 $L2$ ）。事实上，对比文件 1 中公开的断裂延伸率相当于 $(L1-L0)/L0 \times 100\%$ （即，包含弹性形变和塑性形变两部分），其显然与本申请中的绝对塑性变形率 $(L2-L0)/L0 \times 100\%$ 是不同的。

因此，对比文件 1 没有公开本申请权利要求 1 中记载的绝对塑性变形率，并且本领域技术人员根据对比文件 1 公开的断裂延伸率也无法计算或推断出隔离膜的绝对塑性变形率，更不用说计算或推断出隔离膜中的多孔基材的绝对塑性变形率。

基于以上理由，除了审查意见通知书认定的区别技术特征（即，多孔层还包括粘剂）以外，本申请权利要求1与对比文件1的区别还在于：多孔基材在第一方向的绝对塑性变形率为40%~1800%。由于审查意见中没有认定出本申请权利要求1与对比文件1的全部区别技术特征，其关于创造性的结论是不完整且不正确的。

另外，对比文件1中的隔离膜在受到撞击、穿钉、侧面挤压等滥用时能迅速延伸展开，可防止因隔离膜的脆性撕裂引起的正负极片的直接接触（请参见对比文件1说明书第[0009]段）。即，对比文件1中的隔离膜具有抗穿刺性，更难撕裂。但是对比文件1并没有考虑隔离膜在受到撞击、穿钉、侧面挤压等滥用时隔离膜撕裂后的情况。例如，隔离膜在穿钉过程中存在两个阶段，第一阶段为隔离膜随钉子一同延伸的过程，隔离膜将钉子包裹以隔绝正负极片接触短路，第二阶段为钉子完全刺穿隔离膜后，在力的作用下刺穿部位的隔离膜发生回弹的过程，回弹得越多，钉子露出就越多，正负极片就会通过露出的钉子使正负极片接触短路。对比文件1显然只考虑了第一阶段的情况，但是并没有考虑第二阶段隔离膜的回弹，也就是说，在第一阶段隔离膜随钉子延伸得再多，如果塑性变形率太小，在钉子完全刺穿隔离膜后，隔离膜大部分均会回弹（类似橡皮筋被拉断时的情形），还是会导致第二阶段正负极片的接触短路。

在本申请中，多孔基材具有较高的塑性变形率。如本申请说明书所述，多孔基材在外力作用下会产生较大的塑性变形，使得当隔离膜受钉子穿刺作用时，会随着钉子产生较大的延伸变形且回弹少（类似橡皮泥被拉断时的情形），从而保持对正负极的隔绝作用，防止锂离子电池内部短路，提升锂离子电池的安全性（请参见本申请公开文本说明书第[0027]段）。即，当本申请的隔离膜被钉子刺破后依然可以包裹钉子，防止短路。

至少基于以上理由，本申请相比于对比文件1是非显而易见的，具有创造性。

请您充分考虑上述意见，继续对本申请进行审查。如果您认为本申请还存在任何问题，请再次给予我们修改或陈述意见的机会。欢迎您随时联系代理人(010-85187141-850)。谢谢！

国家知识产权局

100005

北京市东城区建国门南大街7号万豪中心A座2202室 北京律盟知识产权代理有限公司
萧辅宽(10-85187141-17)

发文日:

2020年10月12日



申请号或专利号: 201810640157.9

发文序号: 2020093001335790

申请人或专利权人: 宁德新能源科技有限公司

发明创造名称: 隔离膜和电化学装置

第二次审查意见通知书

1. ☒ 审查员已经收到申请人于 2020 年 8 月 26 日提交的意见陈述书,在此基础上审查员对上述专利申请继续进行实质审查。

☐ 根据国家知识产权局于 ____ 年 ____ 月 ____ 日作出的复审决定,审查员对上述专利申请继续进行实质审查。

2. ☐ 经审查,申请人于 ____ 提交的修改文件,不符合专利法实施细则第 51 条第 3 款的规定,不予接受。

3. 继续审查是针对下列申请文件进行的:

- ☐ 上述意见陈述书中所附的经修改的申请文件。
☐ 前次审查意见通知书所针对的申请文件以及上述意见陈述书中所附的经修改的申请文件替换文件。
☒ 前次审查意见通知书所针对的申请文件。
☐ 上述复审决定所确定的申请文件。

4. ☒ 本通知书未引用新的对比文件。

☐ 本通知书引用下列对比文件(其编号续前,并在今后的审查过程中继续沿用):

编号	文 件 号 或 名 称	公开日期 (或抵触申请的申请日)
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5. 审查的结论性意见:

关于说明书:

- ☐ 申请的内容属于专利法第 5 条规定的不授予专利权的范围。
☐ 说明书不符合专利法第 26 条第 3 款的规定。
☐ 说明书的修改不符合专利法第 33 条的规定。
☐ 说明书的撰写不符合专利法实施细则第 17 条的规定。
☐ ____

关于权利要求书:

- ☐ 权利要求 ____ 不符合专利法第 2 条第 2 款的规定。
☐ 权利要求 ____ 不符合专利法第 9 条第 1 款的规定。

210403
2019.4

纸件申请, 回函请寄: 100088 北京市海淀区蓟门桥西土城路 6 号 国家知识产权局专利局受理处收
 电子申请, 应当通过电子专利申请系统以电子文件形式提交相关文件。除另有规定外, 以纸件等其他形式提交的文件视为未提交。



国家知识产权局

申请号: 201811065
申请人于 2020 年
次提出如下审查意见。
1. 权利要求 1 所

- ☐ 权利要求____不具备专利法第 22 条第 2 款规定的新颖性。
- ☐ 权利要求____不具备专利法第 22 条第 3 款规定的创造性。
- ☐ 权利要求____不具备专利法第 22 条第 4 款规定的实用性。
- ☐ 权利要求____属于专利法第 25 条规定的不授予专利权的范围。
- ☒ 权利要求 1 不符合专利法第 26 条第 4 款的规定。
- ☐ 权利要求____不符合专利法第 31 条第 1 款的规定。
- ☐ 权利要求____的修改不符合专利法第 33 条的规定。
- ☐ 权利要求____不符合专利法实施细则第 19 条的规定。
- ☐ 权利要求____不符合专利法实施细则第 20 条的规定。
- ☐ 权利要求____不符合专利法实施细则第 21 条的规定。
- ☐ 权利要求____不符合专利法实施细则第 22 条的规定。
- ☐ _____

☐ 申请不符合专利法第 26 条第 5 款或者实施细则第 26 条的规定。

☐ 申请不符合专利法第 20 条第 1 款的规定。

☐ 分案申请不符合专利法实施细则第 43 条第 1 款的规定。

上述结论性意见的具体分析见本通知书的正文部分。

6. 基于上述结论性意见, 审查员认为:

☐ 申请人应当按照通知书正文部分提出的要求, 对申请文件进行修改。

☒ 申请人应当在意见陈述书中论述其专利申请可以被授予专利权的理由, 并对通知书正文部分中指出的不符合规定之处进行修改, 否则将不能授予专利权。

☐ 专利申请中没有可以被授予专利权的实质性内容, 如果申请人没有陈述理由或者陈述理由不充分, 其申请将被驳回。

☐ _____

7. 申请人应注意下列事项:

(1) 根据《专利优先审查管理办法》第 11 条、第 12 条的规定: 申请人答复发明专利审查意见通知书的期限为通知书发文日起 2 个月, 如果申请人逾期不答复, 国家知识产权局可以停止优先审查程序, 按普通程序处理, 即根据专利法第 37 条的规定, 申请人应当在收到本通知书之日起的 2 个月内陈述意见, 如果申请人无正当理由逾期不答复, 其申请将被视为撤回。

(2) 申请人对其申请的修改应当符合专利法第 33 条的规定, 不得超出原说明书和权利要求书记载的范围, 同时申请人对专利申请文件进行的修改应当符合专利法实施细则第 51 条第 3 款的规定, 按照本通知书的要求进行修改。

(3) 申请人的意见陈述书和/或修改文本应当邮寄或递交国家知识产权局专利局受理处, 凡未邮寄或递交给受理处的文件不具备法律效力。

(4) 未经预约, 申请人和/或代理人不得前来国家知识产权局与审查员举行会晤。

8. 本通知书正文部分共有 1 页, 并附有下列附件:

☐ 引用的对比文件的复印件共____份____页。

☐ _____

审查员: 陈恒桥

联系电话: 028-62967712

审查部门: 专利审查协作四川中心电学发明审查部

210403
2019.4

纸件申请, 回函请寄: 100088 北京市海淀区蓟门桥西土城路 6 号 国家知识产权局专利局受理处收
电子申请, 应当通过电子专利申请系统以电子文件形式提交相关文件。除另有规定外, 以纸件等其他形式提交的文件视为未提交。

国家知识产权局

第二次审查意见通知书

申请号:2018106401579

申请人于2020年8月26日提交了意见陈述书,审查员在阅读了上述文件后,对本案继续审查,再次提出如下审查意见。

1. 权利要求1所要求保护的技术方案不符合专利法第二十六条第四款的规定

权利要求1中通过“多孔基材在第一方向的绝对塑性变形率为40%~1800%”对多孔基材进行限定。然而,本领域中对“绝对塑性变形率”并没有明确的定义,本领域技术人员并不清楚其具体含义,此外本领域技术人员也知悉表征材料的力学性能的参数是依据于具体的测试方法确定的,而本领域技术人员也并不知晓“绝对塑性变形率”的具体测定方法。因此,权利要求1不清楚,不符合专利法第26条第4款的规定。

另外,权利要求1仅记载了隔离膜的基本组成以及力学性能特征,其覆盖了所有能够满足上述限定的用任何原料(包括主材、添加剂、溶剂等)、制备方法所制备的隔离膜。然而,申请文件记载的实施例仅仅给出了采用100万分子量的PE粉末作为原料制备多孔基材,并且通过调整纵向和横向拉伸倍率(拉伸比)得到不同塑性变形率的多孔基材的方法。本领域技术人员根据说明书的记载内容,难以预期对于分子量和/或主材不同的其他多孔基材,是否同样能够通过调整纵向和横向拉伸倍率(拉伸比)得到不同塑性变形率的多孔基材,也难以预期,是否存在其他制备方法可以达到权利要求所限定的力学性能。

因此,权利要求1所限定的参数是基于特定的原料和制备方法实现的,本领域技术人员由说明书公开的内容不能明了除了用本申请说明书实施例所记载的原料和制备方法之外还可以采用说明书中未提到的其他替代方式来实现,以满足权利要求的限定,并解决本申请的技术问题、达到相同的技术效果。因此,权利要求1没有以说明书为依据,得不到说明书的支持,不符合专利法第26条第4款的规定。

基于上述理由,本申请按照目前的文本还不能被授予专利权。申请人应当在本通知书指定的答复期限内对本通知书提出的问题逐一进行答复,必要时应修改专利申请文件,否则本申请将难以获得批准。申请人对申请文件的修改应当符合专利法第33条的规定,不得超出原说明书和权利要求书记载的范围。

审查员姓名:陈恒桥

审查员代码:629869

210403
2019.4

纸件申请,回函请寄:100088 北京市海淀区蓟门桥西土城路6号 国家知识产权局专利局受理处收
电子申请,应当通过电子专利申请系统以电子文件形式提交相关文件。除另有规定外,以纸件等其他形式提交的文件视为未提交。

权 利 要 求 书

1. 一种隔离膜, 包括:

多孔基材; 以及

多孔层;

其中, 所述多孔层设置在所述多孔基材的表面, 所述多孔层包括无机颗粒和粘结剂, 所述多孔基材在第一方向的绝对塑性变形率为 40%~1800%, 其中所述绝对塑性变形率根据方程 $(L2-L0)/L0 \times 100\%$ 计算, 其中 $L0$ 表示所述多孔基材被拉伸前的长度, $L2$ 表示所述多孔基材被拉伸至断裂且沿由所述断裂导致的端口对接并展平后的所述多孔基材的长度。

2. 根据权利要求 1 所述的隔离膜, 其中, 所述多孔基材在第二方向的绝对塑性变形率为 60%~1800%。

3. 根据权利要求 1 所述的隔离膜, 其中, 所述多孔基材具有以下性质中的至少一种:

在第一方向的绝对塑性变形率为 40%~1600%; 和

在第二方向的绝对塑性变形率为 70%~1600%。

4. 根据权利要求 1 所述的隔离膜, 其中, 所述多孔基材具有以下性质中的至少一种:

在第一方向的相对塑性变形率为 50%~100%; 和

在第二方向的相对塑性变形率为 60%~100%;

5. 根据权利要求 4 所述的隔离膜, 其中, 所述多孔基材具有以下性质中的至少一种:

在第一方向的相对塑性变形率为 65%~90%; 和

在第二方向的相对塑性变形率为 75%~90%。

6. 根据权利要求 1 所述的隔离膜, 其中, 所述粘结剂包括从由偏二氟乙烯-六氟丙烯的共聚物、偏二氟乙烯-三氯乙烯的共聚物、聚甲基丙烯酸甲酯、聚丙烯酸、聚丙烯酸盐、聚丙烯腈、聚乙烯基吡咯烷酮、聚乙酸乙烯酯、乙烯-乙酸乙烯酯的共聚物、聚酰亚胺、聚氧化乙烯、乙酸纤维素、乙酸丁酸纤维素、乙酸丙酸纤维素、氰基乙基支链淀粉、氰基乙基聚乙烯醇、氰基乙基纤维素、氰基乙

基蔗糖、支链淀粉、羧甲基纤维素钠、羧甲基纤维素锂、丙烯腈-苯乙烯-丁二烯的共聚物、聚乙烯醇、聚乙烯醚、聚四氟乙烯、聚六氟丙烯、苯乙烯-丁二烯的共聚物、聚偏二氟乙烯组成的群组中选择的至少一个。

7. 根据权利要求 1 所述的隔离膜, 其中, 所述无机颗粒包括从由氧化铝、二氧化硅、氧化镁、氧化钛、二氧化铪、氧化锡、二氧化铈、氧化镍、氧化锌、氧化钙、氧化锆、氧化钇、碳化硅、勃姆石、氢氧化铝、氢氧化镁、氢氧化钙、硫酸钡组成的群组中选择的至少一个。

8. 根据权利要求 1 所述的隔离膜, 其中, 所述多孔基材包括聚合物膜、多层聚合物膜或无纺布, 其中所述聚合物膜、多层聚合物膜或无纺布是由以下任一种聚合物或两种以上的聚合物所形成: 聚乙烯、聚丙烯、聚对苯二甲酸乙二醇酯、聚对苯二甲酸丁二醇酯、聚苯二甲酰苯二胺、聚酯、聚缩醛、聚酰胺、聚碳酸酯、聚酰亚胺、聚醚醚酮、聚芳醚酮、聚醚酰亚胺、聚酰胺酰亚胺、聚苯并咪唑、聚醚砜、聚苯醚、环烯烃共聚物、聚苯硫醚或者聚乙烯萘。

9. 根据权利要求 1 所述的隔离膜, 其中, 所述多孔基材的厚度为 $1\sim 40\ \mu\text{m}$ 。

10. 根据权利要求 1 所述的隔离膜, 其中, 所述多孔基材的孔隙率为 $10\%\sim 70\%$ 。

11. 一种电化学装置, 包括:

正极;

负极; 以及

根据权利要求 1-10 所述的隔离膜。

12. 根据权利要求 11 所述的电化学装置, 其中, 所述电化学装置包括锂离子电池。

请按照“注意事项”正确填写本表各栏

① 专 专 利 利 或 申 申 请 请	申请号或专利号 2018106401579
	发明创造名称 隔离膜和电化学装置
	申请人或专利权人 (*应当填写第一署名申请人) 宁德新能源科技有限公司
② 陈述事项: 关于费用的意见陈述请使用意见陈述书 (关于费用) 以下选项只能选择一项 ☒ 针对国家知识产权局于 2020 年 10 月 12 日发出的第二次审查意见通知书 (发文序号 2020093001335790) 陈述意见。 ☐ 针对国家知识产权局于 年 月 日发出的 通知书 (发文序号) 补充陈述意见。 ☐ 主动提出修改 (根据专利法实施细则第 51 条第 1 款、第 2 款的规定)。 ☐ 其他事宜。	
③ 陈述的意见: 请见附页!	
④ 附件清单 【附件名称】 意见陈述书附页、权利要求书对照页、权利要求书替换页 【附件属性】 电子件 已备案的证明文件备案编号: _____。	
⑤ 当事人或专利代理机构签字或者盖章 北京律盟知识产权代理有限公司 2020 年 11 月 13 日	⑥ 国家知识产权局处理意见 年 月 日



权 利 要 求 书

1. 一种隔离膜，包括：

多孔基材；以及

多孔层；

其中，所述多孔层设置在所述多孔基材的表面，所述多孔层包括无机颗粒和粘结剂，所述多孔基材在第一方向的绝对塑性变形率为 40%~1800%，其中所述绝对塑性变形率根据方程 $(L2-L0)/L0 \times 100\%$ 计算，其中 $L0$ 表示所述多孔基材被拉伸前的长度， $L2$ 表示所述多孔基材被拉伸至断裂且沿由所述断裂导致的端口对接并展平后的所述多孔基材的长度。

2. 根据权利要求 1 所述的隔离膜，其中，所述多孔基材在第二方向的绝对塑性变形率为 60%~1800%。

3. 根据权利要求 1 所述的隔离膜，其中，所述多孔基材具有以下性质中的至少一种：

在第一方向的绝对塑性变形率为 40%~1600%；和

在第二方向的绝对塑性变形率为 70%~1600%。

4. 根据权利要求 1 所述的隔离膜，其中，所述多孔基材具有以下性质中的至少一种：

在第一方向的相对塑性变形率为 50%~100%；和

在第二方向的相对塑性变形率为 60%~100%；

5. 根据权利要求 4 所述的隔离膜，其中，所述多孔基材具有以下性质中的至少一种：

在第一方向的相对塑性变形率为 65%~90%；和

在第二方向的相对塑性变形率为 75%~90%。

6. 根据权利要求 1 所述的隔离膜，其中，所述粘结剂包括从由偏二氟乙烯-六氟丙烯的共聚物、偏二氟乙烯-三氯乙烯的共聚物、聚甲基丙烯酸甲酯、聚丙烯酸、聚丙烯酸盐、聚丙烯腈、聚乙烯基吡咯烷酮、聚乙酸乙烯酯、乙烯-乙酸乙烯酯的共聚物、聚酰亚胺、聚氧化乙烯、乙酸纤维素、乙酸丁酸纤维素、乙酸丙酸纤维素、氰基乙基支链淀粉、氰基乙基聚乙烯醇、氰基乙基纤维素、氰基乙

基蔗糖、支链淀粉、羧甲基纤维素钠、羧甲基纤维素锂、丙烯腈-苯乙烯-丁二烯的共聚物、聚乙烯醇、聚乙烯醚、聚四氟乙烯、聚六氟丙烯、苯乙烯-丁二烯的共聚物、聚偏二氟乙烯组成的群组中选择的至少一个。

7. 根据权利要求 1 所述的隔离膜, 其中, 所述无机颗粒包括从由氧化铝、二氧化硅、氧化镁、氧化钛、二氧化钪、氧化锡、二氧化铈、氧化镍、氧化锌、氧化钙、氧化锆、氧化钇、碳化硅、勃姆石、氢氧化铝、氢氧化镁、氢氧化钙、硫酸钡组成的群组中选择的至少一个。

8. 根据权利要求 1 所述的隔离膜, 其中, 所述多孔基材包括聚合物膜、多层聚合物膜或无纺布, 其中所述聚合物膜、多层聚合物膜或无纺布是由以下任一种聚合物或两种以上的聚合物所形成: 聚乙烯、聚丙烯、聚对苯二甲酸乙二醇酯、聚对苯二甲酸丁二醇酯、聚苯二甲酰苯二胺、聚酯、聚缩醛、聚酰胺、聚碳酸酯、聚酰亚胺、聚醚醚酮、聚芳醚酮、聚醚酰亚胺、聚酰胺酰亚胺、聚苯并咪唑、聚醚砜、聚苯醚、环烯烃共聚物、聚苯硫醚或者聚乙烯萘。

9. 根据权利要求 1 所述的隔离膜, 其中, 所述多孔基材的厚度为 1~40 μm 。

10. 根据权利要求 1 所述的隔离膜, 其中, 所述多孔基材的孔隙率为 10%~70%。

11. 一种电化学装置, 包括:

正极;

负极; 以及

根据权利要求 1-10 所述的隔离膜。

12. 根据权利要求 11 所述的电化学装置, 其中, 所述电化学装置包括锂离子电池。

尊敬的审查员，您好！

非常感谢您对本申请认真细致的审查工作！经过仔细研读审查意见，申请人修改了权利要求书，并陈述意见如下：

1、清楚问题

申请人进一步限定了权利要求 1 中的绝对塑性变形率的测试方法，即“其中所述绝对塑性变形率根据方程 $(L2-L0)/L0 \times 100\%$ 计算，其中 L0 表示所述多孔基材被拉伸前的长度，L2 表示所述多孔基材被拉伸至断裂且沿由所述断裂导致的端口对接并展平后的所述多孔基材的长度”。修改依据请参见本申请公开文本 CN108807821A 说明书第 [0026]-[0028]段。

因此，修改后的权利要求 1 保护范围清楚，符合专利法第 26 条第 4 款的规定。

2、支持问题

尽管本申请仅采用 100 万的 PE 粉制备多孔基材，但本领域技术人员应该知道多孔基材的塑性变形率主要受制备过程中的拉伸条件影响，在本申请说明书已经揭示了制备过程的前提下，且在本申请的实施例中已经指出了选用原料的成分、分子量的情况下，本领域技术人员知晓不同材料和分子量的多孔基材均可通过改变拉伸倍率得到所需的绝对塑性变形率。

因此，修改后的权利要求 1 可得到说明书的支持，符合专利法第 26 条第 4 款的规定。

请您充分考虑上述意见，继续对本申请修改后的文本进行审查。如果您认为本申请还存在任何问题，请再次给予我们修改或陈述意见的机会。欢迎您随时联系代理人（010-85187141-850）。谢谢！

国家知识产权局

100005

北京市东城区建国门南大街7号璞邸酒店A座2202室 北京律盟知识
产权代理有限公司
萧辅宽(10-85187141-17)

发文日:

2020年12月09日



申请号或专利号: 201810640157.9

发文序号: 2020120400777040

申请人或专利权人: 宁德新能源科技有限公司

发明创造名称: 隔离膜和电化学装置

第三次审查意见通知书

1. ☒ 审查员已经收到申请人于 2020 年 11 月 13 日提交的意见陈述书, 在此基础上审查员对上述专利申请继续进行实质审查。

☐ 根据国家知识产权局于 ____ 年 ____ 月 ____ 日作出的复审决定, 审查员对上述专利申请继续进行实质审查。

2. ☐ 经审查, 申请人于 ____ 提交的修改文件, 不符合专利法实施细则第 51 条第 3 款的规定, 不予接受。

3. 继续审查是针对下列申请文件进行的:

☐ 上述意见陈述书中所附的经修改的申请文件。

☒ 前次审查意见通知书所针对的申请文件以及上述意见陈述书中所附的经修改的申请文件替换文件。

☐ 前次审查意见通知书所针对的申请文件。

☐ 上述复审决定所确定的申请文件。

☐ ____

4. ☒ 本通知书未引用新的对比文件。

☐ 本通知书引用下列对比文件(其编号续前, 并在今后的审查过程中继续沿用):

编号	文件号或名称	公开日期 (或抵触申请的申请日)
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5. 审查的结论性意见:

关于说明书:

☐ 申请的内容属于专利法第 5 条规定的不授予专利权的范围。

☐ 说明书不符合专利法第 26 条第 3 款的规定。

☐ 说明书的修改不符合专利法第 33 条的规定。

☐ 说明书的撰写不符合专利法实施细则第 17 条的规定。

☐ ____

关于权利要求书:

☐ 权利要求 ____ 不符合专利法第 2 条第 2 款的规定。

☐ 权利要求 ____ 不符合专利法第 9 条第 1 款的规定。

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2019.4

纸件申请, 回函请寄: 100088 北京市海淀区蓟门桥西土城路 6 号 国家知识产权局专利局受理处收
电子申请, 应当通过电子专利申请系统以电子文件形式提交相关文件。除另有规定外, 以纸件等其他形式提交的文件视为未提交。



- ☐ 权利要求____不具备专利法第 22 条第 2 款规定的新颖性。
☒ 权利要求 1-12 不具备专利法第 22 条第 3 款规定的创造性。
☐ 权利要求____不具备专利法第 22 条第 4 款规定的实用性。
☐ 权利要求____属于专利法第 25 条规定的不授予专利权的范围。
☐ 权利要求____不符合专利法第 26 条第 4 款的规定。
☐ 权利要求____不符合专利法第 31 条第 1 款的规定。
☐ 权利要求____的修改不符合专利法第 33 条的规定。
☐ 权利要求____不符合专利法实施细则第 19 条的规定。
☐ 权利要求____不符合专利法实施细则第 20 条的规定。
☐ 权利要求____不符合专利法实施细则第 21 条的规定。
☐ 权利要求____不符合专利法实施细则第 22 条的规定。
☐ _____

- ☐ 申请不符合专利法第 26 条第 5 款或者实施细则第 26 条的规定。
☐ 申请不符合专利法第 20 条第 1 款的规定。
☐ 分案申请不符合专利法实施细则第 43 条第 1 款的规定。
上述结论性意见的具体分析见本通知书的正文部分。

6. 基于上述结论性意见, 审查员认为:

- ☐ 申请人应当按照通知书正文部分提出的要求, 对申请文件进行修改。
☐ 申请人应当在意见陈述书中论述其专利申请可以被授予专利权的理由, 并对通知书正文部分中指出的不符合规定之处进行修改, 否则将不能授予专利权。
☒ 专利申请中没有可以被授予专利权的实质性内容, 如果申请人没有陈述理由或者陈述理由不充分, 其申请将被驳回。
☐ _____

7. 申请人应注意下列事项:

(1) 根据《专利优先审查管理办法》第 11 条、第 12 条的规定: 申请人答复发明专利审查意见通知书的期限为通知书发文日起 2 个月, 如果申请人逾期不答复, 国家知识产权局可以停止优先审查程序, 按普通程序处理, 即根据专利法第 37 条的规定, 申请人应当在收到本通知书之日起的 2 个月内陈述意见, 如果申请人无正当理由逾期不答复, 其申请将被视为撤回。

(2) 申请人对其申请的修改应当符合专利法第 33 条的规定, 不得超出原说明书和权利要求书记载的范围, 同时申请人对专利申请文件进行的修改应当符合专利法实施细则第 51 条第 3 款的规定, 按照本通知书的要求进行修改。

(3) 申请人的意见陈述书和/或修改文本应当邮寄或递交国家知识产权局专利局受理处, 凡未邮寄或递交给受理处的文件不具备法律效力。

(4) 未经预约, 申请人和/或代理人不得前来国家知识产权局与审查员举行会晤。

8. 本通知书正文部分共有 3 页, 并附有下列附件:

- ☐ 引用的对比文件的复印件共____份____页。
☐ _____

审查员: 陈恒桥

联系电话: 028-62967712

审查部门: 专利审查协作四川中心电学发明审查部

210403
2019. 4

纸件申请, 回函请寄: 100088 北京市海淀区蓟门桥西土城路 6 号 国家知识产权局专利局受理处收
电子申请, 应当通过电子专利申请系统以电子文件形式提交相关文件。除另有规定外, 以纸件等其他形式提交的文件视为未提交。

国家知识产权局

第三次审查意见通知书

申请号:2018106401579

申请人于2020年11月13日提交了意见陈述书和经过修改的申请文件,审查员在阅读了上述文件后,对本案继续进行审查,再次提出如下审查意见。

1. 权利要求1所要求保护的技术方案不具备专利法第二十二条第三款规定的创造性

权利要求1请求保护一种隔离膜。对比文件1(CN105449140A)为最接近的现有技术,其公开了一种隔离膜及锂离子二次电池,并具体公开了以下技术特征(参见说明书第[0013]-[0026]、[0147]、[0155]-[0157]段):根据本发明第一方面所述的隔离膜中,所述隔离膜(相当于多孔基材)可选自聚烯烃、聚酰亚胺、聚氨酯、聚异氰酸酯中的至少一种;隔离膜的表面可涂布有无机颗粒涂层和/或有机颗粒涂层(相当于多孔层,且多孔层设置在多孔基材的表面,多孔层包括无机颗粒),以使隔离膜具有更强的耐热性和抗穿刺性;

隔离膜横向方向的断裂延伸率为900%;其中,基于对比文件1记载的断裂延伸率测定方式,并结合本申请的相关表述方式,可将断裂延伸率表述为 $(L_1-L_0)/L_0$,而本申请的绝对塑性变形率计算方程为: $(L_2-L_0)/L_0$,根据对比文件1与本申请公开的内容,本领域技术人员可以直接毫无疑义确定, $L_1 \geq L_2$,因此, $(L_1-L_0)/L_0 \geq (L_2-L_0)/L_0$,即对比文件1的 $(L_2-L_0)/L_0 \leq 900\%$,该范围与40%-1800%部分重叠。

当隔离膜横向方向及纵向方向同时具有高的断裂延伸率时,即隔离膜横向方向(TD)的断裂延伸率与隔离膜横向方向的机械强度的比值较高,同时隔离膜纵向方向的机械强度与隔离膜纵向方向(MD)的断裂延伸率的比值较低,此时,当锂离子二次电池受到钉子等针状异物冲击时,隔离膜纵向方向(MD)和横向方向(TD)优异的延展性会阻止钉子等针状异物刺破隔离膜,并且隔离膜还可包裹住钉子的尖部,防止其接触正负极片,进而有利于保护锂离子二次电池。

因此,该权利要求所要求保护的技术方案与该对比文件所公开的技术内容相比,其区别技术特征在于:多孔层还包括粘结剂,由此确定其实际解决的技术问题为:如何设置多孔层。

然而,使用粘结剂来将无机颗粒固定在多孔基材上是本领域的常规技术手段。

因此,在对比文件1的基础上结合上述公知常识以获得该权利要求所要求保护的技术方案,对所属技术领域的技术人员来说是显而易见的,因此该权利要求所要求保护的技术方案不具备突出的实质性特点和显著的进步,因而不具备专利法第二十二条第三款规定的创造性。

2. 权利要求2-3所要求保护的技术方案不具备专利法第二十二条第三款规定的创造性

权利要求2-3均是权利要求1的从属权利要求。然而,对比文件1已经公开了(参见说明书第[0013]-[017]段):由权1评述可知,隔离膜横向方向的 $(L_2-L_0)/L_0 \leq 900\%$ (相当于第一方向的绝对塑性变形率 $\leq 900\%$,与本申请交叉);隔离膜纵向方向的断裂延伸率可为600%,基于同样的计算方法可知,隔离膜纵向方向的 $(L_2-L_0)/L_0 \leq 600\%$ (相当于第二方向的绝对塑性变形率 $\leq 600\%$,与本申请的范围部分重叠)。

在其引用的权利要求不具备创造性的情况下,上述从属权利要求也不具备专利法第二十二条第三款规定的创造性。

3. 权利要求4-5所要求保护的技术方案不具备专利法第二十二条第三款规定的创造性

权利要求4、5分别是权利要求1、4的从属权利要求。首先,本领域技术人员知悉,相对塑性变形率是



衡量材料塑性变形能力的一个指标。

其次,对比文件 1 已经给出了通过使用具有良好延展性的多孔基材,借助其良好的塑性变形能力在钉子等针状异物刺入电池时能够随异物延展并将其包裹起来,进而提高电池安全性这一技术手段。在此基础上,本领域技术人员为了选用适宜的多孔基材,容易想到可以使用相对塑性变形率这一指标对多孔基材的塑性变形能力进行评估并通过有限的试验确定适宜的第一方向和/或第二方向的相对塑性变形率范围。

在其引用的权利要求不具备创造性的情况下,上述从属权利要求也不具备专利法第二十二条第三款规定的创造性。

4. 权利要求 6-10 所要求保护的技术方案不具备专利法第二十二条第三款规定的创造性

权利要求 6-10 均是权利要求 1 的从属权利要求。然而,对比文件 1 已经公开了(参见说明书第[0020]-[0021]、[0025]段,表 1):隔离膜可选自聚烯烃、聚酰亚胺、聚氨酯、聚异氰酸酯中的至少一种,聚烯烃可选自聚丙烯(PP)、聚乙烯(PE)中的至少一种;

无机颗粒涂层中的无机颗粒可选自氧化铝、二氧化硅、二氧化钛、二氧化铈、碳酸钙、氧化钙、氧化锌、氧化镁、钛酸铈、钛酸钙、钛酸钡、磷酸锂、磷酸钛锂、磷酸钛铝锂、氮化锂、钛酸镧锂中的至少一种;

由表 1 实施例 1 可见,隔膜厚度为 16 微米(公开了本申请的小范围)。

此外,二氧化铅、氧化锡、氧化镍、氧化锆、氧化钇、碳化硅、勃姆石、氢氧化铝、氢氧化镁、氢氧化钙、硫酸钡均是本领域常见具有电化学稳定性的无机颗粒,使用上述材料中的一种或多种来替换或者与对比文件 1 中一种或多种无机颗粒组合作为多孔层中的无机颗粒是本领域技术人员的常规选择。

而偏二氟乙烯-六氟丙烯的共聚物、偏二氟乙烯-三氯乙烯的共聚物、聚甲基丙烯酸甲酯、聚丙烯酸、聚丙烯酸盐、聚丙烯腈、聚乙烯基吡咯烷酮、聚乙酸乙烯酯、乙烯-乙酸乙烯酯的共聚物、聚酰亚胺、聚氧化乙烯、乙酸纤维素、乙酸丁酸纤维素、乙酸丙酸纤维素、氰基乙基支链淀粉、氰基乙基聚乙醇醇、氰基乙基纤维素、氰基乙基蔗糖、支链淀粉、羧甲基纤维素钠、羧甲基纤维素锂、丙烯腈-苯乙烯-丁二烯的共聚物、聚乙烯醇、聚乙烯醚、聚四氟乙烯、聚六氟丙烯、苯乙烯-丁二烯的共聚物、聚偏二氟乙烯也是本领域常见的隔膜用粘合剂材料,使用上述材料中的一种或多种作为多孔层的粘合剂以将无机颗粒固定在多孔基材上是本领域技术人员的常规选择。

将多孔基材设计为包括聚合物膜、多层聚合物膜或无纺布膜是本领域技术人员的常规设置;进一步的,聚对苯二甲酸乙二醇酯、聚对苯二甲酸丁二醇酯、聚苯二甲酰苯二胺、聚酯、聚缩醛、聚酰胺、聚碳酸酯、聚醚醚酮、聚芳醚酮、聚醚酰亚胺、聚酰胺酰亚胺、聚苯并咪唑、聚醚砜、聚苯醚、环烯烃共聚物、聚苯硫醚、聚乙烯萘也都是本领域常见的隔膜材料,使用上述材料中的一种或多种来制造聚合物膜、多层聚合物膜或无纺布膜也是本领域技术人员的常规选择。

本领域技术人员还知悉,隔膜的孔隙率一方面会影响电池的内阻,另一方面也会影响隔膜的强度。具体来说,孔隙率越低,离子迁移速率越慢,进而表现为内阻增大,但隔膜的强度越大,越不容易被破坏;孔隙率越高,离子迁移速率越快,内阻越小,但隔膜的强度也越不稳定。因此,本领域技术人员可以基于对隔膜实际的需求(例如强度以及离子透过率的需求)通过有限的试验来确定适宜的孔隙率。

在其引用的权利要求不具备创造性的情况下,上述从属权利要求也不具备专利法第二十二条第三款规定的创造性。

5. 权利要求 11 所要求保护的技术方案不具备专利法第二十二条第三款规定的创造性

权利要求 11 请求保护一种电化学装置。对比文件 1 (CN105449140A) 为最接近的现有技术, 其公开了一种隔离膜及锂离子二次电池(相当于电化学装置), 并具体公开了以下技术特征(参见说明书第[0026]段):

锂离子二次电池(相当于电化学装置), 包括: 正极片; 负极片; 隔离膜, 间隔于正极片和负极片之间; 以及电解液。

此外, 基于在先权利要求的评述意见可知, 权利要求 1-10 所述的隔离膜不具有创造性。

因此, 当权利要求 11 所述的电化学装置选择性的采用权利要求 1-10 所述的隔离膜时, 其不具有突出的实质性特点与显著的进步, 因而不具有专利法第二十二条第三款规定的创造性。

12. 权利要求 12 所要求保护的技术方案不具备专利法第二十二条第三款规定的创造性

权利要求 12 引用了权利要求 11。然而, 对比文件 1 已经公开了一种锂离子二次电池(相当于电化学装置包括锂离子电池)。

在其引用的权利要求不具备创造性的情况下, 上述从属权利要求也不具备专利法第二十二条第三款规定的创造性。

基于上述理由, 本申请因为所有权利要求均不具有创造性而不能被授予专利权, 说明书中也没有可以被授予专利权的实质性内容, 因而本申请不具备被授予专利权的前景。如果申请人不能在本通知书规定的答复期限内提出表明本申请具有创造性的充分理由, 本申请将被驳回。

审查员姓名: 陈恒桥

审查员代码: 629869

权 利 要 求 书

1. 一种隔离膜, 包括:

多孔基材; 以及

多孔层;

其中, 所述多孔层设置在所述多孔基材的表面, 所述多孔层包括无机颗粒和粘结剂, 所述多孔基材在第一方向的绝对塑性变形率为 40%~1800%, 所述多孔基材在所述第一方向的相对塑性变形率为 50%~100%, 其中所述绝对塑性变形率根据方程 $(L2-L0)/L0 \times 100\%$ 计算, 所述相对塑性变形率根据方程 $(L2-L0)/(L1-L0) \times 100\%$ 计算, 其中 $L0$ 表示所述多孔基材被拉伸前的长度, $L1$ 表示所述多孔基材被拉伸至断裂的最大长度, $L2$ 表示所述多孔基材被拉伸至断裂且沿由所述断裂导致的端口对接并展平后的所述多孔基材的长度。

2. 根据权利要求 1 所述的隔离膜, 其中, 所述多孔基材在第二方向的绝对塑性变形率为 60%~1800%。

3. 根据权利要求 1 所述的隔离膜, 其中, 所述多孔基材具有以下性质中的至少一种:

在第一方向的绝对塑性变形率为 40%~1600%; 和

在第二方向的绝对塑性变形率为 70%~1600%。

4. 根据权利要求 1 所述的隔离膜, 其中, 所述多孔基材在第二方向的相对塑性变形率为 60%~100%。

5. 根据权利要求 1 所述的隔离膜, 其中, 所述多孔基材在第一方向的相对塑性变形率为 65%~90%。

6. 根据权利要求 4 所述的隔离膜, 其中, 所述多孔基材在第二方向的相对塑性变形率为 75%~90%。

7. 根据权利要求 1 所述的隔离膜, 其中, 所述粘结剂包括从由偏二氟乙烯-六氟丙烯的共聚物、偏二氟乙烯-三氯乙烯的共聚物、聚甲基丙烯酸甲酯、聚丙烯酸、聚丙烯酸盐、聚丙烯腈、聚乙烯基吡咯烷酮、聚乙酸乙烯酯、乙烯-乙酸乙烯酯的共聚物、聚酰亚胺、聚氧化乙烯、乙酸纤维素、乙酸丁酸纤维素、乙酸丙酸纤维素、氰基乙基支链淀粉、氰基乙基聚乙烯醇、氰基乙基纤维素、氰基乙

请按照“注意事项”正破	
① 专利或申请	申请
	②

13. 根据权利要求 12 所述的电化学装置, 其中, 所述电化学装置包括锂离子电池。

请按照“注意事项”正确填写本表各栏

① 专 专 利 利 或 申 申 请 请	申请号或专利号 2018106401579
	发明创造名称 隔离膜和电化学装置
	申请人或专利权人 (*应当填写第一署名申请人) 宁德新能源科技有限公司
② 陈述事项: 关于费用的意见陈述请使用意见陈述书 (关于费用) 以下选项只能选择一项 ☒ 针对国家知识产权局于 2020 年 12 月 09 日发出的第三次审查意见通知书 (发文序号 2020120400777040) 陈述意见。 ☐ 针对国家知识产权局于 年 月 日发出的 通知书 (发文序号) 补充陈述意见。 ☐ 主动提出修改 (根据专利法实施细则第 51 条第 1 款、第 2 款的规定)。 ☐ 其他事宜。	
③ 陈述的意见: 请见附页!	
④ 附件清单 【附件名称】 意见陈述书附页、权利要求书对照页、权利要求书替换页 【附件属性】 电子件 已备案的证明文件备案编号: _____。	
⑤ 当事人或专利代理机构签字或者盖章 北京律盟知识产权代理有限公司 2020 年 12 月 29 日	⑥ 国家知识产权局处理意见 年 月 日

20201229

意见陈述书



1.

权 利 要 求 书

1. 一种隔离膜, 包括:

多孔基材; 以及

多孔层;

其中, 所述多孔层设置在所述多孔基材的表面, 所述多孔层包括无机颗粒和粘结剂, 所述多孔基材在第一方向的绝对塑性变形率为 40%~1800%, 所述多孔基材在所述第一方向的相对塑性变形率为 50%~100%, 其中所述绝对塑性变形率根据方程 $(L2-L0)/L0 \times 100\%$ 计算, 所述相对塑性变形率根据方程 $(L2-L0)/(L1-L0) \times 100\%$ 计算, 其中 $L0$ 表示所述多孔基材被拉伸前的长度, $L1$ 表示所述多孔基材被拉伸至断裂的最大长度, $L2$ 表示所述多孔基材被拉伸至断裂且沿由所述断裂导致的端口对接并展平后的所述多孔基材的长度。

2. 根据权利要求 1 所述的隔离膜, 其中, 所述多孔基材在第二方向的绝对塑性变形率为 60%~1800%。

3. 根据权利要求 1 所述的隔离膜, 其中, 所述多孔基材具有以下性质中的至少一种:

在第一方向的绝对塑性变形率为 40%~1600%; 和

在第二方向的绝对塑性变形率为 70%~1600%。

4. 根据权利要求 1 所述的隔离膜, 其中, 所述多孔基材具有以下性质中的至少一种:

在第一方向的相对塑性变形率为 ~~50%~100%~~; 和

在第二方向的相对塑性变形率为 ~~60%~100%~~。

5. 根据权利要求 ~~4~~ 所述的隔离膜, 其中, 所述多孔基材具有以下性质中的至少一种:

在第一方向的相对塑性变形率为 ~~65%~90%~~; 和

6. 根据权利要求 4 所述的隔离膜, 其中, 所述多孔基材在第二方向的相对塑性变形率为 75%~90%。

7. 根据权利要求 1 所述的隔离膜, 其中, 所述粘结剂包括从由偏二氟乙烯-六氟丙烯的共聚物、偏二氟乙烯-三氯乙烯的共聚物、聚甲基丙烯酸甲酯、聚丙

烯酸、聚丙烯酸盐、聚丙烯腈、聚乙烯基吡咯烷酮、聚乙酸乙烯酯、乙烯-乙酸
乙烯酯的共聚物、聚酰亚胺、聚氧化乙烯、乙酸纤维素、乙酸丁酸纤维素、乙酸
丙酸纤维素、氰基乙基支链淀粉、氰基乙基聚乙烯醇、氰基乙基纤维素、氰基乙
基蔗糖、支链淀粉、羧甲基纤维素钠、羧甲基纤维素锂、丙烯腈-苯乙烯-丁二烯
的共聚物、聚乙烯醇、聚乙烯醚、聚四氟乙烯、聚六氟丙烯、苯乙烯-丁二烯的
共聚物、聚偏二氟乙烯组成的群组中选择的至少一个。

78. 根据权利要求 1 所述的隔离膜, 其中, 所述无机颗粒包括从由氧化铝、
二氧化硅、氧化镁、氧化钛、二氧化钪、氧化锡、二氧化铈、氧化镍、氧化锌、
氧化钙、氧化锆、氧化钇、碳化硅、勃姆石、氢氧化铝、氢氧化镁、氢氧化钙、
硫酸钡组成的群组中选择的至少一个。

89. 根据权利要求 1 所述的隔离膜, 其中, 所述多孔基材包括聚合物膜、多
层聚合物膜或无纺布, 其中所述聚合物膜、多层聚合物膜或无纺布是由以下任一
种聚合物或两种以上的聚合物所形成: 聚乙烯、聚丙烯、聚对苯二甲酸乙二醇酯、
聚对苯二甲酸丁二醇酯、聚苯二甲酰苯二胺、聚酯、聚缩醛、聚酰胺、聚碳酸酯、
聚酰亚胺、聚醚醚酮、聚芳醚酮、聚醚酰亚胺、聚酰胺酰亚胺、聚苯并咪唑、聚
醚砜、聚苯醚、环烯烃共聚物、聚苯硫醚或者聚乙烯萘。

910. 根据权利要求 1 所述的隔离膜, 其中, 所述多孔基材的厚度为 1~40 μm 。

1011. 根据权利要求 1 所述的隔离膜, 其中, 所述多孔基材的孔隙率为
10%~70%。

1112. 一种电化学装置, 包括:

正极;

负极; 以及

根据权利要求 1-1011 所述的隔离膜。

1213. 根据权利要求 1112 所述的电化学装置, 其中, 所述电化学装置包括
锂离子电池。

尊敬的审查员，您好！

非常感谢您对本申请认真细致的审查工作！经过仔细研读审查意见，申请人修改了权利要求书，并陈述意见如下：

一、修改内容

1、申请人将原权利要求 4 中记载的多孔基材在第一方向的相对塑性变形率并入权利要求 1 中，并限定了相对塑性变形率的计算方程。

2、相应地修改权利要求的编号及引用关系。

修改依据请参见本申请公开文本 CN108807821A 说明书第[0025]-[0030]段。以上修改没有引入新的内容，符合专利法第 33 条的规定。

二、意见陈述

本申请修改后的权利要求 1 记载了“所述多孔基材在第一方向的相对塑性变形率为 50%~100%”。

本申请说明书公开了“相对塑性变形率”的测试方法如下（请参见本申请公开文本 CN108807821A 说明书第[0075]-[0078]段）：

“（1）多孔基材的塑性变形率测试方法

将多孔基材分别沿第一方向和第二方向裁成尺寸为 100 mm×20 mm 的长条，在长条的长度方向的 100 mm 范围内任意选取长度为 $L_0=40$ mm 的一段区域，并在该区域的两端做标记线，采用高铁拉力机以 50 mm/min 的速度拉伸该标记线间的区域，拉伸至断裂，记录拉伸达到的最大长度 L_1 ，然后将断开的多孔基材沿断口对接并展平，测试其自然状态下的长度 L_2 ，通过下式计算多孔基材在某一方向上的绝对塑性变形率 ε_1 和相对塑性变形率 ε_2 ：

$$\varepsilon_1=(L_2-L_0)/L_0\times 100\%$$

$$\varepsilon_2=(L_2-L_0)/(L_1-L_0)\times 100\%$$

该测试方法如图 1 所示：

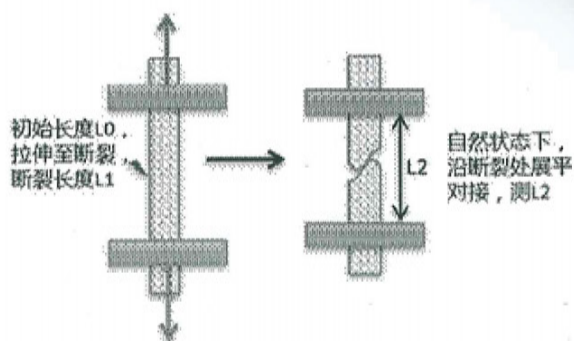


图1。

本申请还公开了以下内容（请参见本申请公开文本说明书第[0026]段）：

“多孔基材在拉伸测试过程中，既会产生弹性变形，也会产生塑性变形。弹性变形量= $L1-L2$ ，塑性变形量= $L2-L0$ ，总的变形量=弹性变形量+塑性变形量。塑性变形是一种永久性的变形，不会发生回弹。”

本申请修改后的权利要求1中记载的相对塑性变形率反映了多孔基材的塑性变形量占总变形量的百分比。相对塑性变形率越高，多孔基材在拉伸时发生的塑性变形（即，永久性变形）越多，多孔基材越不容易回弹。

对比文件1（CN105449140A）没有公开、教导或建议本申请要求保护的多孔基材的相对塑性变形率。

另外，如答复第一次审查意见通知书时所述，对比文件1中的隔离膜在受到撞击、穿钉、侧面挤压等滥用时能迅速延伸展开，可防止因隔离膜的脆性撕裂引起的正负极片的直接接触（请参见对比文件1说明书第[0009]段）。即，对比文件1中的隔离膜具有抗穿刺性，更难撕裂。但是对比文件1并没有考虑隔离膜在受到撞击、穿钉、侧面挤压等滥用时隔离膜撕裂后的情况。具体的，隔离膜在穿钉过程中存在两个阶段，第一阶段为隔离膜随钉子一同延伸的过程，隔离膜将钉子包裹以隔绝正负极片接触短路，第二阶段为钉子完全刺穿隔离膜后，在力的作用下刺穿部位的隔离膜发生回弹的过程，回弹得越多，钉子露出就越多，正负极片就会通过露出的钉子使正负极片接触短路。对比文件1显然只考虑了第一阶段的情况，但是并没有考虑第二阶段隔离膜的回弹，也就是说，即使在第一阶段隔离膜随钉子延伸得再多，如果相对塑性变形率太小，在钉子完全刺穿隔离膜后，隔离膜大部分均会回弹（类似橡皮筋被拉断时的情形），还是会导致第二阶段正负极片的接触短路。

在本申请中，多孔基材具有较高的相对塑性变形率。如本申请说明书所述，多孔基材在外力作用下会产生较大的塑性变形，使得当隔离膜受钉子穿刺作用时，会随着钉子产生较大的延伸变形且回弹少（类似橡皮泥被拉断时的情形），从而保持对正负极的隔绝作用，防止锂离子电池内部短路，提升锂离子电池的安全性（请参见本申请公开文本说明书第[0027]段）。即，当本申请的隔离膜被钉子刺破后依然可以包裹钉子，防止短路。

至少基于以上理由，本申请修改后的权利要求1相比于对比文件1是非显而易见的，具有创造性。同理，修改后的权利要求2-13相比于对比文件1也具有创造性。

请您充分考虑上述意见，继续对本申请修改后的文本进行审查。如果您认为本申请还存在任何问题，请再次给予我们修改或陈述意见的机会。欢迎您随时联系代理人（010-85187141-850）。谢谢！

国家知识产权局

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北京市东城区建国门南大街7号璞邸酒店A座2202室 北京律盟知识产权代理有限公司
萧辅宽(10-85187141-17)

发文日:

2021年02月19日



申请号或专利号: 201810640157.9

发文序号: 2021010701936060

申请人或专利权人: 宁德新能源科技有限公司

发明创造名称: 隔离膜和电化学装置

授予发明专利权通知书

1. 根据专利法第39条及实施细则第54条的规定, 上述发明专利申请经实质审查, 没有发现驳回理由, 现作出授予专利权的通知。

申请人收到本通知书后, 还应当依照办理登记手续通知书的内容办理登记手续。

申请人按期办理登记手续后, 国家知识产权局将作出授予专利权的决定, 颁发发明专利证书, 并予以登记和公告。

期满未办理登记手续的, 视为放弃取得专利权的权利。

法律、行政法规规定相应技术的实施应当办理批准、登记等手续的, 应依照其规定办理。

2. 授予专利权的上述发明专利申请是以下列申请文件为基础的:

☐原始申请文件。 ☐分案申请递交日提交的文件。 ☒下列申请文件:

申请日提交的摘要附图、说明书摘要、说明书第1-190段、说明书附图;

2020年12月29日提交的权利要求第1-13项。

3. 授予专利权的上述发明专利申请的名称:

☒未变更。

☐由_变更为上述名称。

4. ☐申请人于____年____月____日提交专利号为____的“放弃专利权声明”, 经审查:

☐进入放弃专利权的程序。

☐未进入放弃专利权的程序。理由是: 申请人声明放弃的专利与本发明专利申请不属于相同的发明创造。

5. ☐审查员依职权对申请文件修改如下:

注: 在本通知书发出后收到的申请人主动修改的申请文件, 不予考虑。

审查员: 陈恒桥

审查部门: 专利审查协作四川中心电学发明
审查部

联系电话: 028-62967712

210413
2020.3

纸件申请, 回函请寄: 100088 北京市海淀区蓟门桥西土城路6号 国家知识产权局专利局受理处收
电子申请, 应当通过电子专利申请系统以电子文件形式提交相关文件。除另有规定外, 以纸件等其他形式提交的文件视为未提交。